POSTERS' SESSION

POSTERS' SESSION PS21
BLOOD PRESSURE VARIABILITY

PP.21.01 FASTING CORTISOL PLASMA LEVEL AND VARIABILITY OF HEMODYNAMIC STATE IN HYPERTENSIVE PATIENTS

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Objective: The aim of study was to investigate the relationship between cortisol plasma concentration and some characteristics of cardiac remodeling and hemodynamics in patients with essential arterial hypertension (AH).

Design and method: 81 patients with AH (32 males, 51±9 years old) were enrolled in the study. Mean office blood pressure (BP) of the examined patients was 148±15/94±6 mm Hg. The fasting plasma cortisol concentration was determined by immunoassay. Cardiac remodeling and peculiarities of hemodynamics were assessed by echocardiography and 24-hours BP monitoring. Data are presented as mean ± standard deviation and correlation coefficient.

Results: The fasting cortisol plasma level varied significantly among hypertensives (377.9±190.6 nmol/l) and correlated with few parameters of hemodynamics such as diurnal systolic BP variability (r=0.25, p=0.02) and diurnal heart rate variability (r=0.26, p=0.02). Moreover, there were positive correlation of cortisol with relative thickness of left ventricular wall (r=0.36, p=0.001) and negative correlations with end diastolic diameter of left ventricle (r=-0.34, p=0.002), stroke volume (r=-0.27, p=0.02)and cardiac output (r=-0.33, p=0.004).

Conclusions: High fasting plasma cortisol level is associated with tendency of hemodynamic to be more variable and myocardial remodeling to be more concentric in hypertensive patients.

PP.21.02 THE AMBULATORY CONTROL AND 24-HOUR BLOOD PRESSURE MONITORING IN HYPERTENSIVE PATIENTS

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Objective: The purpose of the study was to evaluate of the results of blood pressure (BP) self-measurement and ambulatory BP monitoring (ABPM) in patients(pts) with arterial hypertension (AH).

Design and method: We examined 286 pts during the year (135 men, mean age - 58.8±6.4 years, duration AH - 15.2±5.8 years). The data of home BP measurement were evaluated twice a day, ABPM - twice a year.

Results: 72% of pts measured their home BP on regular basis. Target BP<140/90 mm Hg was achieved in 53% of pts, <130/85– in 24 %, <130/80– in 9 %. BP remained >140/90 mm Hg in 14 % of pts. On ABPM the data were obtained: mean daily systolic BP (SBP) decreased <130 mm Hg, <140, and <150 in 21%, 42% and 25% of pts respectively; however it remained >150 mm Hg in 12% of pts. Indicators of a day-time mean SBP <130 mm Hg, <140 and <150 were observed in 29%, 37% and 23% of pts respectively; over 150 mm Hg - in 11% of pts. Indicators of night-time mean SBP <120 mm Hg, <130, <140 were determined in 26%, 44% and 21% of pts respectively; over 140 mm Hg – in 9% of pts. The mean daily diastolic BP (DBP) <80 mm Hg, <85 and <90 was determined in 19%, 34% and 38% of pts respectively, however it remained > 90 mm Hg in 9% of pts. The day-time mean DBP <80 mm Hg, <85 and <90 was observed in 24%, 37% and 28% of pts respectively; it remained > 90 mm Hg in 11% of pts. Night-time mean DBP <80 mm Hg, <85 and <90 was found in 32%, 39% and 19% of pts respectively; it remained > 90 mm Hg in 10% of pts. Pts with good control of BP had taken 3 (59% of pts), 4 (33%) and 5 (8%) antihypertensive drugs. Pts with poor control of BP had taken 1 (9%), 2 (72%) or 3 (19%) drugs.

Conclusions: Home BP measurement is the most optimal BP control regimen for patients.

PP.21.03 THE ANALYSIS OF PLASMA RENIN LEVEL IN PATIENTS WITH PHEOCHROMOCYTOMA

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Objective: Besides of hypertension, pheochromocytoma(PHEO) will lead to high secretion of rennin. The study aims to evaluate the level of the plasma rennin of pheochromocytoma.

Design and method: A retrospective study was performed in the 15 inpatients that were diagnosed as pheochromocytomas by pathology after surgery in the Center of Hypertension of Xinjiang from 1997 to 2004 were enrolled. The inpatients with essential hypertension were selected as controls matched by age, gender as well as ethnic during the same period. The controls met the following criteria (1) systolic blood pressure >=140mmHg and/or diastolic blood pressure >= 90 mmHg (2) free of common secondary hypertension. The measurement of plasma rennin: after 7 hours lay back in supine position at night, the blood samples were obtained by venipuncture at 8 Am in the next morning and measured as soon as possible.

Results: (1) The mean level of the plasma rennin in patients with PHEO was (2.54±3.30) ng/ml/h and (1.86 ±2.42) ng/ml/h in patients with essential hypertension. But no significant difference was found between PHEO and EH group (P>0.05).

Conclusions: There is no significant difference of the rennin in patients with pheochromocytoma and essential hypertension.

PP.21.04 EFFECT OF BISOPROLOL ON CENTRAL AORTIC PRESSURE IN CHINESE HYPERTENSIVE PATIENTS

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Objective: Central aortic pressure differs from brachial blood pressure (BP) and may be a superior predictor of cardiovascular events. Recent studies have suggested that compared with other antihypertensive treatments, beta-blockers are less effective in reducing central aortic pressures despite similar effects on brachial BP. The present study compared the effects of bisoprolol, a highly selective beta1-blocker, on central aortic and brachial BP in Chinese patients with essential hypertension.

Design and method: This was an open-label study in 35 hypertensive patients. Central systolic pressure (C-SBP), pulse pressure (C-PP), radial augmentation index (rAI), radial augmentation pressure (rAP), brachial SBP (Br-SBP), pulse pressure (Br-PP) and heart rate (HR) were derived from the radial artery waveform obtained by pulse wave analysis using the BPro radial pulse wave acquisition device with A-PULSE software at baseline, 24 hours after the first dose and after 6 weeks treatment with bisoprolol 2.5 mg daily.

Results: Thirty-five patients (age 54±10 years, 57% male) completed a single dose of bisoprolol and 31 patients (age 54±10 years, 55% male) completed 6 weeks treatment. At 24 hours after the first dose, the changes in C-SBP, Br-SBP, C-PP, Br-PP, HR, rAI and rAP were -10.5±10.6 mmHg (p<0.01), -11.9±11.0 mmHg (p<0.01), -4.1±8.9 mmHg (p=0.02), -5.5±9.9 mmHg (p<0.01), -2.6±5.7 beats/min (p=0.02), +3.0±14.1% (p=0.26) and -1.2±6.3 mmHg (p=0.32), respectively. After 6 weeks of treatment, the pre-dose changes in C-SBP, Br-SBP, C-PP, Br-PP, HR, rAI and rAP were -14.0±13.6 mm Hg (p<0.01), -14.6±13.5 mmHg (p<0.01), -5.5±8.9 mmHg (p<0.01), -6.5±9.0 mmHg (p<0.01), -2.6±5.0 beats/min (p<0.01), 1.8±16.7 (p=0.57) and -0.7±6.4 (p=0.55). There were significantly greater reductions in C-SBP than in Br-SBP (1.4±3.1 mmHg, p=0.02) and in C-PP than Br-PP (1.4±3.1 mmHg, p=0.02) after the first dose whereas after 6 weeks of treatment pre-dose differences in reduction of C-SBP and Br-SBP (0.6±4.1, p=0.43) and C-PP and Br-PP (1.0±3.0, p=0.08) were not significant.

Conclusions: These findings suggest that low dose bisoprolol has similar effects on central and brachial SBP with long-term treatment.

PP.21.05 ACTIVATION OF D4 DOPAMINE RECEPTOR DECREASES AT1 ANGIOTENSIN II RECEPTOR EXPRESSION IN RAT RENAL PROXIMAL TUBULE CELLS

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Objective: The dopaminergic and renin angiotensin systems interact to regulate blood pressure. Disruption of the D4 dopamine receptor gene in mice produces hypertension that is associated with increased renal AT1 receptor expression. We hypothesize that D4 receptor can inhibit AT1 receptor expression and function in renal proximal tubules (RPTs) cells from Wistar-Kyoto (WKY) rats, the regulation of D4 receptor on AT1 receptor is aberrant in RPT cells from spontaneously hypertensive rats (SHRs).

Results: The D4 receptor agonist, PD168077, decreased AT1 receptor protein expression in a time (0-30hrs)- and concentration (10-9-10-5M)-dependent manner in WKY RPT cells. In contrast, in SHR cells, PD168077 (10-6M) increased AT1 receptor protein expression. The inhibitory effect of D4 receptor on AT1 receptor expression in WKY RPT cells was blocked by a calcium channel blocker, nicardipine (10-6M) or calcium free medium, indicating that calcium channel was involved as a signaling molecule in the D4 receptor-mediated signaling pathway. Angiotensin II (10-11M) increased Na+-K+ ATPase activity in WKY cells. Pretreatment with PD168077 (10-6M/24hrs) decreased the stimulatory effects of angiotensin II on Na+-K+ ATPase activity in WKY cells. However, in SHR cells, the inhibitory effect of D4 receptor on angiotensin II-mediated effect on Na+-K+ ATPase activity was aberrant; pretreatment with D4 receptor agonist augmented the stimulatory effect of AT1 receptor on Na+-K+ ATPase activity in SHR cells.

Conclusions: We suggest that a differential interaction between D4 and AT1 receptors may play a role in the differential regulation of sodium excretion and blood pressure in hypertension.

PP.21.06 RED BLOOD CELL DISTRIBUTION WIDTH, MEAN PLATELET VOLUME AND NEUTROPHIL/LYMPHOCYTE RATIO IN 'NON-DIPPERS' VERSUS 'DIPPERS'

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Objective: Diurnal BP variation or circadian rhythm adds prognostic value to the absolute BP elevation. Patients with blunted nocturnal dip have worse cardiovascular outcomes than dippers. We aimed to investigate whether red blood cell distribution width (RDW) , mean platelet volume (MPV) and neutrophil/lymphocyte ratio (NLR) are elevated in non-dipper hypertensive patients compared with dippers.

Design and method: This retrospective study included 116 patients.Twenty-four-hour ambulatory blood pressure monitoring (ABPM) was performed for each patient. Thereafter patients were divided into two groups: 54 dipper hypertensives (mean age; 54,7 ± 13,6) and 62 non-dipper hypertensives (mean age; 59,7±12,6). Complete blood count and biochemistry were performed in all subjects.

Results: Daytime systolic and diastolic BP measurements were similar between dippers and non-dippers, but night-time measurements were significantly different (night-time systolic BP: 127.7 +/-12,7 vs 116+/-11,4 mmHg, p<0.0001; night-time diastolic BP: 78,6+/-9,01 vs 72,4+/-8,5 mmHg, p<0.0001). Non-dippers had significantly higher RDW levels than dippers (14,46+/-1,29 vs 13,79+/-1,19% p =0.005). Non-dipper patients demonstrated higher levels of MPV and NLR compared with dippers (9,49+/-1,08 vs 8,93+/-0,97 fL p=0,05 and 2,12+/-0,67 vs 2,70+/-1,07 p<0,001). RDW was negatively correlated with the percentage decline of systolic and diastolic BP from day to night (r = - 0.208, p <0,025 and r = - 0.278, p <0,003, respectively), also RDW was positively correlated with the night systolic BP (r=0,233, p<0,012). There was significant negative correlation between MPV and percentage decline of systolic and diastolic BP from day to night (r=-0,209, p<0,025 and r=-0,205 and p<0,028 respectively). NLR was negatively correlated with the percentage decline of systolic and diastolic BP from day to night (r=-0,210, p<0,023 and r=-0,19 and p>0,039 respectively.

Conclusions: Our results suggest that patients with non-dipper hypertensive patients tend to have increased platelet activation and inflammatory response.

Table1: Clinical Characteristics of the patients

	Non-dippers (n=62)	Dippers(n=54)	P value
Age (Years)	59.7±12.6	54.7±13.6	0.04
Male (%)	29(46.8%)	26(48.1%)	0.882
Female (%)	33(53.2%)	28(51.9%)	
Current smoker (%)	17(27.4%)	16(29.6%)	0.792
Ejection Fraction (%)	59.5±4.8	60.2±6.3	0.493
Hyperlipidemia(%)	13(21%)	6(11.1%)	0.152
Diabetes Mellitus (%)	12(19.4%)	14(25.9%)	0.397
Stroke (%)	1(1.6%)	0(0)	0.349
Coronary artey disease (%)	4(6.5%)	2(3.7%)	0.505
Medical treatment			
Beta blocker (%)	21(34.4%)	15(27.8%)	0.443
Ca-canal blocker (%)	9(14.5%)	12(22.2%)	0.282
ARB (%)	12(19.4%)	17(31.5%)	0.132
ACE-I (%)	32(51.6%)	19(35.2%)	0.075
Diüretic(%)	9(14.5%)	11(20.4%)	0.405

ACE-I; angiotensin converting enzyme inhibitor, ARB; angiotensin receptor blocker.

Table 2: Systolic and diastolic BP of the patients during day and night.

	Non-dippers mean ± SD	Dippers mean ± SD	P value
Day systolic BP (mmHg)	130.1±10.8	131.8±13.5	0.456
Day diastolic BP (mmHg)	83.3±9.4	85.5±9.3	0.199
Night systolic BP (mmHg)	127.7±12.7	116.6±11.4	0.0001
Night diastolic BP (mmHg)	78.6±9.01	72.4±8.5	0.0001

BP: Blood pressure.

Table 3: Biochemical variables of the patients.

	Non-dippers	Dippers	p
Hemoglobin (g/L)	13.5±1.9	14.0±1.6	0.10
RDW	14.46±1.29	13.79±1.19	0.005
MPV	9.49±1.08	8.93±0.97	0.005
Neutrophil	4.88±1.35	4.27±1.25	0.014
Lymphocyte	1.92±0.51	2.11±0.59	0.065
NLR	2.70±1.07	2.12±0.67	0.001

RDW: red blood cell distribution width, MPV: mean platelet volume, NLR: neutrophil/lymphocyte ratio

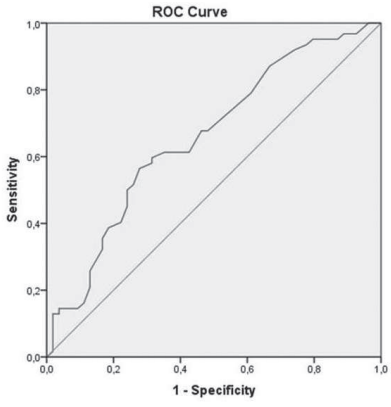

Figure 1. Identification of a cut off value for red cell distribution width in non-dipper hypertensive patients by a receiver operating characteristic curve analysis.

PP.21.07 BLOOD PRESSURE VARIABILITY AND THE RISK FOR MILD COGNITIVE IMPAIRMENT

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Objective: There is data suggesting that excessive blood pressure variability is associated with advanced target organ damage. The case with cognitive impairment, however, is uncertain - some trials show relatively more preserved cognitive functioning in patients with high blood pressure variability. The purpose of this study is to find the precise correlation between blood pressure variability and mild cognitive impairment in hypertensive patients with concomitant cardio-vascular risk factors.

Design and method: 108 hypertensive patients taking antihypertensive treatment were included in this prospective study. 27(25%) were males and 81(75%) females. The mean age was 67.82±8.78 years. All patients completed full medical history assessment, physical examination, cognitive impairment and depression screening, ambulatory blood pressure monitoring, office and home-measurement of blood pressure. The neuropsychological tests used were: Montreal Cognitive Assessment (MoCA) and Mini Mental State Examination (MMSE). There were at least 6 months between the inclusion and the follow-up visit.

Results: The mean results for MoCA were 23.82±3.67 on inclusion and 23.02±3.85 on the follow-up visit. There was a significant ($p<0.0001$) deterioration in the cognitive functioning between the two visits. The results for MMSE were respectively 27.62±2.20 on inclusion and 26.78±2.55 during the follow-up, with a significant ($p<0.0001$) difference between the two.We found a significant ($p<0.05$),moderate, inverse correlation between blood pressure variability and the results from MoCA and MMSE, as well as the results from the specific neuropsychological sub-tests included in MoCA. The higher the blood pressure variability (for both the systolic and the diastolic 24-hour variability), the lower the results from the tests. 52(48.15%) of the patients were with very high SCORE risk result and only 23(21.30%) were with an isolated risk factor – arterial hypertension.

Conclusions: Elevated blood pressure variability is a risk factor for mild cognitive impairment in this group of hypertensive patients with predominantly high and very high cardio-vascular risk. It should be diagnosed and treated properly in order to prevent further cognitive deterioration.

PP.21.08 AMBULATORY BLOOD PRESSURE MONITORING AFFECTS SLEEP QUALITY AND BLOOD PRESSURE

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Objective: During nocturnal non-invasive ambulatory blood pressure monitoring (ABPM), inevitably an undesirable external stimulus due to pump noise and pressure produced by cuff inflation may affect the quality of sleep, influence the physiological nocturnal blood pressure fall and consequently affect dipping status.We assesed the hypothesis that blood pressure monitoring provokes awakenings may affect sleep quality, thus blood pressure and/or heart rate.

Design and method: The study population consisted of 108 consecutive subjects with stage I-II essential hypertension (aged 54±9 years, 59 male, office BP=148/97 mm Hg). Participants were divided into two groups according to whether they underwent ambulatory blood pressure monitoring (group A, n=60), or not (group B, n=48). Repeated measurements of blood pressure were registered with non-invasive automatic blood pressure monitors (Spacelabs 90207, Welch Allyn 6100S devices) every 20 min. Self-reported data regarding the quality of sleep, numbers and duration of arousal were obtained via standardized questionnaire.

Results: Group A compared to group B demonstrated a small but significant increase in the number of nocturnal awakenings (2.8 vs 1.2, $p=0.045$), allthough their duration did not signifficantly differ (p=NS). However, the two groups exhibited similar mean values of nocturnal blood pressure and heart rate (121/73 vs 119/71 mm Hg, 67 vs 65 beats/min, p=NS in both cases). The reported sleep quality did not differ between the two groups but both sleep quality and higher numbers of awakenings (>3) were associated with non-dipping status ($p<0.05$, in both cases).

Conclusions: Our findings indicate that even though ambulatory blood pressure monitoring induces modest sleep disturbances, it can accurately evaluate nighttime blood pressure profile and heart rate, without affecting sleep efficiency and quality. Sleep evaluation may be particularly useful in essential hypertension, as poor quality of nocturnal sleep were associated with non-dipping status.

PP.21.09 HYPERLIPIDEMIA AFTER TREATMENT IN PATIENTS WITH STRESS INDUCED HYPERTENSION

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Objective: The cause of essential hypertension is still unknown. Mental stress could induce hypertension. Male patients with mental disorder generally have a poor appetite, so a blood cholesterol or uric acid level in those patients is within normal limits. Medications such as selective serotonin reuptake inhibitors (SSRI) and counseling is very effective to reduce blood pressure in patients with mental disorder, however, those patients work up appetite after treatment. The purpose of this study is to evaluate a blood cholesterol or uric acid level in patients with stress induced hypertension.

Design and method: We studied 15 male patients with paroxysmal hypertension who experienced unscheduled or emergency consultation due to high blood pressure within 3 months. Also those patients suffered from mental diseases such as depression or anxiety and treated with SSRI and/or alpha and beta blockers in a male menopausal clinic. We evaluated a blood cholesterol or uric acid level after treatment.

Results: About several months after treatment, systolic and diastolic blood pressure significantly deceased (154±14 to 125±9 mmHg, 89±10 to 78±6 mmHg) as improvement of mental condition. Several months later, 10 patients discontinue and other patients decreased antihypertensive. Blood cholesterol level significantly increased from 208±28 to 224±33 mg/dl($p<0.005$) and uric acid level slightly increased from 5.4±0.8 to 5.8±0.8 mg/dl, but not significant ($p=0.06$).

Conclusions: Mental therapy could be effective in patients with stress induced hypertension. However, we should care about life-style related diseases after mental treatment.

PP.21.10 CENTRAL PULSE PRESSURE MAY PREDICT VISIT-TO-VISIT SYSTOLIC BLOOD PRESSURE VARIABILITY IN CONTROLLED ARTERIAL HYPERTENSION

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Objective: A growing body of evidence that visit-to-visit systolic blood pressure variability (SBPV) in treated hypertensive patients may have impact on prognosis stimulates searching for its predictors. The aim of the study was to evaluate SBPV and its predictors in patients with controlled arterial hypertension (AH).

Design and method: 52 pts (20 men, age 58,9±9,0 yrs; 4 smokers; 6 diabetics) with uncomplicated AH were treated to target BP<140/90mmHg with combination of an ACEI or an ARB and amlodipine for 1 yr. Baseline BP was 163,4±8,1/100,9±4,2 mmHg; achieved BP 123,7±9,7/76,8±6,7 mmHg. SBPV was calculated as SD for 3-5 visits during 6-9 months after target BP achievement. Routine evaluations, central BP and pulse wave velocity (PWV) measurement were done before treatment initiation. Spearman correlation analysis was done to reveal relationship between SBPV and other variables. $p<0,05$ was considered significant.

Results: SBPV after achievement of target BP varied from 1,79 mmHg to 16,79 mmHg (tertile I < 5,38; II 5,38 - 7,78; III > 7,78 mmHg). Trend towards earlier target BP achievement was observed in patients with the lowest SBPV: in 1 month of therapy BP control rate in tertile I was 64,7%, tertile II 35,3%, tertile III 47,1%, respectively. There was no significant difference between tertiles of SBPV in age (I 56,6±8,94, II 59,4±9, III 60,7±9,1 yrs, $p>0,05$), gender, metabolic risk factors, baseline and achieved BP. Higher SBPV was associated with higher baseline central pulse pressure: for tertile I 47,2±10,6, tertile II 55,6±11 ($p<0,05$ vs tertile I), tertile III 51,1±11,5 mmHg ($p<0,05$ vs tertile I). Baseline central PP<50 mmHg predicted low SBPV with the sensitivity 45% and specificity 77%. No significant difference was found for augmentation index (23,3±11,2 vs 23,2±13,4 vs 25,5±9,1% for corresponding tertiles, $p>0,05$) and PWV (13±1,6 vs 14,2±2,2 vs 12,9±1,8 m/s). No correlation was found between SBPV and any other clinical characteristics, including baseline central PP.

Conclusions: Association between baseline central PP and SBPV after achievement of target BP confirms the role arterial stiffness as predictor of BP variability. The impact of early BP control for long-term BP variability needs further evaluation.

PP.21.11 VISIT-TO-VISIT BLOOD PRESSURE VARIABILITY IN PATIENTS WITH CONTROLLED ARTERIAL HYPERTENSION AND STABLE CORONARY HEART DISEASE

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Objective: There is a growing evidence of the prognostic significance of visit-to-visit BP variability (BPV) in different groups of patients. The aim of the study was to evaluate BPV and its prognostic significance in controlled hypertensives with stable coronary heart disease (CHD).

Design and method: The study included 19 pts (13 men, age 69,2±5,85 yrs) with controlled arterial hypertension (baseline BP 125,9±7,8/75,5±8,2 mmHg, HR 75,7±4,9) and stable CHD without heart failure or systolic dysfunction. Patients received standard therapy with ACE inhibitors, beta-blockers, ivabradine, thiazide diuretics or calcium channel blockers, statins and low-dose aspirin. BP was measured with a validated oscillometric device. Visit-to-visit BPV was calculated as SD for 8 visits during 3 yrs. The antihypertensive treatment remained stable. The endpoints included death from CHD, myocardial infarction (MI), stroke, hospitalization for CHD.

Results: After 3 years BP was 123,8±13,6 mmHg, HR 67,1±10,5 bpm. Visit-to visit systolic BPV varied from 0,7 to 23,3 mmHg, diastolic BPV from 0 to 17 mmHg. In 7 patients endpoints were registered (2 deaths and 5 hospitalizations for CHD). There was no significant difference between groups with and without endpoints in age, gender, angina degree, history of MI, baseline BP and its level during the study. There was a trend to lower visit-to visit systolic and diastolic BPV in patients without endpoints (7,2±7,2 vs 9,9±5,3 and 6,1±4,1 vs 8,3±5,1 mmHg, respectively). Patients with endpoints had a higher value of baseline HR (77,4±3,6 vs 74,1±2,8 bpm,p<0,05) and its lesser decrease during observation (-3,4±9,3 vs -11,7±9,3 bpm, p<0,05). There was significant correlations between endpoints and baseline HR (r=0,46, p<0,05) and no correlation was found for visit-to-visit BPV and any other variables.

Conclusions: Despite stable treatment and control of BP a wide range of systolic and diastolic visit-to-visit BPV was observed in hypertensive patients with stable CHD. A trend for association of higher visit-to-visit systolic BPV in patients with worse outcomes needs further evaluation.

PP.21.12 DOCOSAHEXAENOIC ACID POTENTIATES HYPOTENSIVE EFFECTS OF EICOSAPENTAENOIC ACID IN SALT LOADED HYPERTENSIVE RATS

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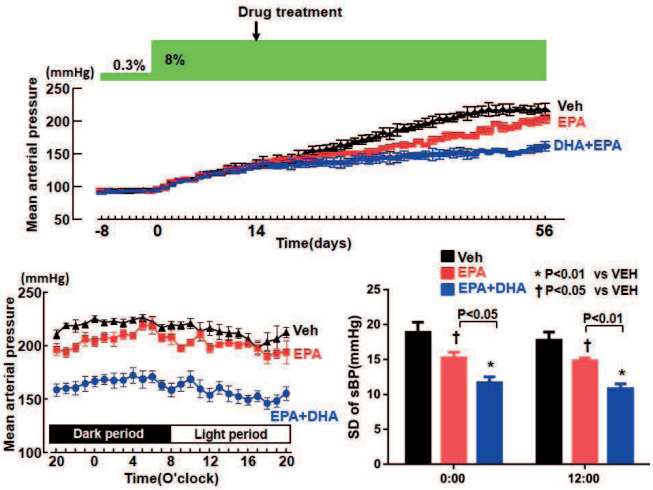
Objective: Omega-3 poly unsaturated fatty acid(PUFA) is effective for treating dyslipidemia, however, its effect on blood pressure(BP) and BP variability is unclear.
The present work was undertaken to compare docosahexaenoic acid(DHA) combined with eicosapentaenoic acid(EPA) treatment and EPA monotherapy, regarding the effect on BP and BP variability.

Design and method: We implanted telemetry devices into Dahl salt-sensitive(DS) hypertensive rats and fed them a high-salt diet from 6 weeks of age. Salt-loaded DS rats were randomized into 3 groups at 11 weeks of age: (1)vehicle,(2) EPA 1500mg/kg/day(EPA) and (3) EPA1500mg/kg/day+ DHA1500mg/kg/day (EPA plus DHA).
All medications were administered orally for 7 weeks once daily at 20:00h.
Using radiotelemetry combined with spectral analysis with a fast Fourier transformation algorithm, we compared the effects of EPA monotherapy and combination of EPA and DHA on BP and its variability during dark(active phase) and light(inactive phase) over 7 weeks in salt-loaded hypertensive rats.
We also compared the effects of these medications on the autonomic nervous systems and natriuresis in salt-loaded hypertensive rats.

Results: EPA treatment demonstrated hypotensive effect in salt-loaded hypertensive rat during dark and light periods.
Interestingly, the EPA plus DHA combination synergistically ameliorated salt-loaded hypertension, compared with EPA monotherapy.
The combination of EPA and DHA exerted a greater attenuation of BP variability in salt-loaded hypertensive rats than EPA monotherapy during dark and light periods.
The combination of EPA and DHA significantly reduced urinary norepinephrine and significantly increased urinary sodium excretion than EPA monotherapy in salt-loaded hypertensive rat. Furthermore, The combination of EPA and DHA significantly reduced low-frequency power of systolic BP and significantly increased spontaneous baroreflex gain than EPA monotherapy in salt-loaded hypertensive rat.



Conclusions: EPA plus DHA treatment synergistically ameliorated salt-loaded hypertension and decreased blood pressure variability, compared with EPA monotherapy.
Our novel finding is that this synergistic improvement of BP and its variability by EPA plus DHA was partially attributable to a greater amelioration of impaired autonomic function and sodium retention in salt-loaded hypertensive rat.
The combination of EPA plus DHA could be a promising therapeutic strategy for salt-sensitive hypertension.

PP.21.13 BLOOD PRESSURE VARIABILITY AND ARTERIAL STIFFNESS IN YOUTH

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Objective: The aim of the present study was to investigate the effect of average ambulatory blood pressure (ABP) and other ABP parameters such as BP variability, daytime to nighttime BP ratio, 24h pulse pressure (PP) on carotid-femoral pulse wave velocity (cf-PWV) as a surrogate marker of arterial stiffness in young subjects.

Design and method: The study population consisted of 138 consecutive young subjects (age range 4-20 years) referred to our hypertension center for elevated BP levels. 24h ABP monitoring and cf-PWV measurements were performed in all subjects. BP variability was measured using the weighted 24-h BP standard deviation (SD), computed as the weighted average of daytime and nighttime BP SD. AASI was calculated as 1 minus the regression slope of diastolic BP on systolic BP.

Results: 10.6% of the subjects had cf-PWV values higher than the 95th pc of the population. In Pearson's bivariate correlations analysis, cf-PWV showed significant correlations with age, height, weight, office systolic and diastolic BP, 24h systolic and diastolic BP, SD of 24h systolic BP, 24h systolic and diastolic BP load, daytime systolic BP, SD of daytime systolic BP, nighttime systolic and diastolic BP, SD of nighttime systolic BP, nighttime PP and estimated central PP. No relationship was found between cf-PWV and any heart rate measurements (office, 24h, 24h heart rate variability), neither between cf-PWV and ambulatory arterial stiffness index (AASI). In analysis of covariance (ANCOVA) cf-PWV was significantly associated with 24h systolic BP variability (95% CI of B 0.037-0.536, P<0.05). Age, gender, office systolic and diastolic BP indices, 24h systolic and diastolic BP indices were not significant determinants of cf-PWV. The ratio of daytime to nighttime systolic BP, AASI, 24h PP and 24h BP loads were also not significantly associated with cf-PWV.

Conclusions: These findings suggest that short-term BP fluctuations may have an impact on structural and functional vascular properties in young subjects independent of absolute BP levels.

PP.21.14 HEART RATE VARIABILITY IN DIPPERS AND EXTREME-DIPPERS

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Objective: Heart rate (HR) ad blood pressure (BP) variability we can estimate as a standard deviation of ambulatory BP and HR monitoring obtained by every 15 to 20 minutes measurement. The non-dipping pattern of ambulatory BP is associated wit secondary hypertension and target organ damage. Hypertensive patients with extreme dipping pattern may have severe cerebrovascular damage than dippers. We investigated difference of heart rate variability (HRV) between non-dippers and extreme dippers.

Design and method: The ambulatory BP and heart rate (HR) were monitored every 20 minutes with a fully automatic device (validated device, ABPM-04 Meditech, Hungary). We used the cuff-oscillometric method for analysis. Participants were told to carry on with their normal daily activities during measurement. We measured the various blood pressure and heart rate parameters by ABPM. The criteria of non-dipping pattern was: diurnal index (DI) <10%, and extreme dipper: DI>20%. We performed Student-t test between the two groups (by SPSS 14).

Results: Non-dipping pattern was found in 834 cases, extreme dipping pattern in 80 cases. The 24-hour systolic blood pressure in non-dipping group (NDG) was 131.42±16.16 mmHg, in the extreme dipping group (EDG) was 126.17±1.94 mmHg ($p<0.01$) and the diastolic was 75.04±12.02 mmHg (NDG) and 73.60±10.95 mm Hg (EDG), N.S. The HR was lower, but not significantly in the NDG than in the EDG, 69.35±9.67 beat/min vs 70.74±8.722 beat/min (N.S.). In contrast of HR, the HRV significantly was lower in the NDG than in the EDG, 8.56±4.61 vs 10.31±4.56 ($p<0.01$).

Conclusions: In NDG we have found a significantly lower HRV. The baroreceptor oscillations are shifted in this group to lower frequencies than in EDG, which may reflect an otherwise altered function of the sympathetic nervous system compared to EDG. The low heart rate variability may exert a poor prognosis in hypertension. We willl plan further investigations to established the consequence of this.

PP.21.15 SHORT TERM EFFECT OF FIMASARTAN FOR 3-MONTHS ON HOME BP AND BP VARIABILITY

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Objective: A fimasartan showed an excellent effects and good safety in large population in previous cross-sectional study (Safe-Kanarb Study). The relationship between blood pressure (BP), its variability, and risk of cardiovascular events is well established. However, it is not known whether short term therapy with fimasartan can affect BP variability in patients with hypertension. The purpose of this study was to evaluate whether 3 months therapy with fimasartan affects home BP and its variability.

Design and method: The study population consisted of 10,481 patients with hypertensionfrom October 2011 to October 2012 in Korea (700 private clinics and 11 university hospitals). Among them, 1,609 patients treated with fimasartan at a daily dose of 30-120 mg for 3 months, who completed 3 months follow up visit and scheduled BP measurement, were enrolled. Home BP was measured in addition to clinic BP. Clinic and home BP measurements were obtained with the same device. At home, 42 measures were taken (3 in the morning and 3 in the evening for 7 consecutive days). Baseline assessments including health behavior questionnaire, blood sampling, ECG and BP measurement were conducted prior to fimasartan treatment and repeated after 3 months.

Results: The mean clinic systolic and diastolic BP significantly reduced from142.98±17.09 mmHg and 88.35±11.17mmHg at baseline to 127.32±13.62 mmHg and 79.56±9.15 mmHg after 3 months. The mean home systolic and diastolic BP significantly reduced from135.11±15.37mmHg and 81.91±10.38 mmHg at baseline to 128.63±14.48 mmHg and 77.42±10.06 mmHg in the morning after 3 months. Day-by-day variability as a standard deviation (SD) of daily home systolic BP mean (mean of 6 readings) in the morning of 6 consecutive days except the first day measurement significantly reduced from 6.74±3.73mmHg to 6.39±3.42mmHg. SD of daily home systolic BP mean in the evening significantly reduced from 7.19±4.00mmHg to 6.76±3.91mmHg. Measure-to-measure variability as the SD of 3 clinic systolic BP reduced from 4.56±3.30mmHgto 4.20±3.07mmHg. These effects were same in the naive, the add-on and the switched groups.

Conclusions: Three months therapy with fimasartan in patients with low-risk significantly reduces systolic and diastolic BP and systolic BP variability.

PP.21.16 NOCTURNAL BLOOD PRESSURE VARIABILITY IS NEGATIVELY ASSOCIATED WITH ARTERIAL STIFFNESS IN A MIDDLE AGED GENERAL POPULATION

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Objective: Blood pressure variability (BPV) is known to be associated with cardiovascular event especially in the lower blood pressure (BP) ranges. Nocturnal blood pressure is known to be associated with salt sensitivity and arterial stiffness. But in contrast to daytime BPV, nocturnal BPV is not unknown for its relation to arterial stiffness.

Design and method: In a population living in a rural area in Gyung-gi province, South Korea, 150 subjects were examined with brachial ankle pulse wave velocity (baPWV) and ambulatory blood pressure monitoring (ABPM) during June 2012 to Jan 2013. Nocturnal BP and BPV was analyzed for the relationship with baPWV by adjusting age, sex, height, bodymass index (BMI), smoking, drinking, diabetes, fasting blood glucose, high density lipoprotein, heart rate according to the antihypertensive medication (AHM) status. Day and night were defined using narrow fixed interval methods.

Results: Age was 47.3±8.1 years and the female proportion was 63.4%. BMI was 25.1±3.2 kg/m². Daytime BPs and nocturnal BPs were 130.4/82.0 mmHg and 111.7/69.9 mmHg, respectively. For mean baPWV, nondipper was independently factor ($\beta=34.3$, $p=0.038$). But SDs for daytime and nocturnal BPs were not independent factors. Regarding AHM status, only SD of nocturnal DBP is positively associated with baPWV in the subject taking AHM ($\beta=1.591$, $p=0.041$). When nocturnal DBP was included in the model, in the subjects not taking AHM (n=127), nocturnal DBP was positively associated ($\beta=5.808$, $p<0.0001$) whereas SD of nocturnal DBP was negatively associated ($\beta=-2.360$, $p=0.039$).

Conclusions: Nocturnal BPV when adjusted by nocturnal BP level was negatively or protectively associated with baPWV in the subject not taking antihypertensive medication. This finding suggests that BPV should be interpreted in the context of BP level and that nocturnal BPV at basal status might be physiologic and healthy finding in contrast to the daytime BPV.

PP.21.17 MODIFICATION OF BLOOD PRESSURE PROFILE IN PATIENTS WITH STROKE

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Objective: Hypertension (HT) is a dominant risk factor and an indicator of prognosis in patients with cerebrovascular accident (CVA), stroke risk is directly related to the elevation of blood pressure (BP). The aim of this study was to evaluate changes in circadian rhythm of blood pressure observed in stroke patients.

Design and method: Patients who had been hospitalized for stroke in the infirmary of our service and who had ambulatory blood pressure measurement (ABPM) in the previous six months presenting profile dipper and in the six months after the stroke were studied . Besides the ABPM patients had clinical examination and analysis . The evaluation of ABPM was performed using a Spacelab 90207 monitor.

Results: The risk factors of 100 patients were included 78 essential hypertension (78%) , diabetes mellitus 25 (25 %) and Smoking 19 (19 %). All patients included in the study had ischemic stroke and 74 (74 %) patients was abolished overnight pressure drop (dip) exceeding 10%, with 28 patients (28 %) presented at the second measurement of a profile dipper inverted (the average overnight pressure was superior to daytime blood pressure) . Comparison of the dipper inverted with no dipper showed no significant difference between the two groups regarding the variables studied , except that BMI was higher in patients dipper reversed. Regarding proteinuria it was found that patients

had significantly higher values (before : 78.06 +64.38 mg / dL after : +101.36 132.73 mg / dl, p <0.01) after stroke as well as elevation of fibrinogen (before : 386 ± 183 mg / dL after 435 ± 201 mg / dl , p <0.01).

Conclusions: In patients with a high body mass index changing profile in addition to not dipper still presented in most cases inverted dipper profile , which alone appears to increase the risk of stroke . Detected is also worsening the inflammatory profile evidenced by fibrinogen and greater severity in renal injury evidenced by proteinuria.

PP.21.18 NON-ALCOHOLIC FATTY LIVER DISEASE IN HYPERTENSIVE PATIENTS

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Objective: Non-alcoholic fatty liver disease (NAFLD) is a common condition affecting 15-20% of the Greek population. Aim of this study was to investigate the prevalence of NAFLD and the relationship between insulin resistance and NAFLD in grade II hypertensive patients depending on their circadian blood pressure rhythm.

Design and method: The study included 158 grade II hypertensive patients of either gender without diabetes mellitus (mean age 51.6±11.3). All patients underwent 24-hour ambulatory blood pressure monitoring (ABPM), blood tests, and abdominal ultrasonography. Insulin resistance was calculated by the homeostasis monitoring assessment (HOMA) formula.

Results: NAFLD was present in 60 (38%) patients. According to diurnal index from ABPM 40 (67%) of the 60 patients were dippers. The prevalence of NAFLD was significantly higher in the non-dipper hypertensive patients group compared to the dipper group (61.2% vs. 30.3%, p-value<0.05). A statistically higher level of the HOMA index was observed in the non-dipper group compared to the dipper group (3.15±1.01 vs. 2.01±0.91, p-value<0.05).

Conclusions: The altered dipping status of hypertension associated with higher insulin resistance could be the pathogenic link between NAFLD and altered blood pressure status.

PP.21.19 REFRACTORY HYPERTENSION: DETECTION OF SUBCLINICAL TARGET ORGAN DAMAGE

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Objective: The aim of this study was to study the correlation between refractory hypertension with subclinical organ damage .

Design and method: A cross-sectional non-experimental descriptive epidemiological study of a cohort of patients from a general hospital was performed .

Results: A sample of 36 patients diagnosed with refractory hypertension seen in consultation during the inclusion period estimated 13 -month period from August 2012 to September 2013 were analyzed.
The mean age of the study was 49 years (+ / - 14 years). 38% were female , 62 % male.
The anthropometric characteristics of the population estudiad were mean weight 77 kg (+ / - 12 kg), mean size 1.70 cm (+ / - 8 cm), average body mass index 26.45 kg/m2 (+ / - 3.7 kg/m2).
Regarding smoking 44.4 % of the sample were smokers with an average consumption of snuff 6 cigarettes / day.
By correlating refractory hypertension with the occurrence of subclinical target organ damage we obtained that 75 % had microalbuminuria with average range of microalbuminuria in fresh urine 40.5 mg / dl (+ / - 30.7 mg / dl). 61.1 % had chronic kidney disease stage 3 with mean glomerular filtration rate of the sample of 63 mil / min. 61.1 % had echocardiographic findings of left ventricular hypertrophy.
In the embodiment of the fundus showed a 80.56 % of patients had hypertensive retinopathy, with the following distribution by classification Scheie.
27.8 % despite no referral clinic PAD pathological features an ankle arm index.
8.3 % had pathological Mini Mental test.
Blood pressure pattern was analyzed by the MAP with the result that 63.9 % had a dipper pattern, 19.4 % non dipper, riser 16.7%.

Conclusions: Patients with refractory hypertension have a high prevalence of cardiovascular risk factors, the most prevalent dyslipidemia and consumption of snuff.
Patients with refractory hypertension has a high prevalence of subclinical target organ damage, the most prevalent lesions in the kidney and retinal.

PP.21.20 CHANGES OF BLOOD PRESSURE IN 24-HOUR ABPM IN PATIENTS WITH HAEMOPOETIC MALIGNANCIES AFTER HIGH-DOSE CHEMOTHERAPY AND HAEMOPOETIC STEM CELL TRANSPLANTATION

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Objective: The study aimed at evaluation of changes of blood pressure using 24-hour ambulatory blood pressure monitoring (ABPM) in patients with haemopoetic malignancies in the course of haemopoetic stem cell transplantation (HSCT).

Design and method: The studies were conducted on 43 consecutive patients with haemopoetic malignancies qualified to the procedure of haemopoetic stem cell transplantation. The mean age of the patients was 42.88 ± 13.49 years. In all participants 24-hour ABPM was conducted prior to the HSCT procedure (test A) and after completion of the HSCT (test B). The defined parameters of ABPM included mean blood pressure (MBP), mean systolic blood pressure (MSBP), mean diastolic blood pressure (MDBP), variability of systolic blood pressure (VSBP), variability of diastolic blood pressure (VDBP) and pulse pressure (PP).

Results: In the entire group of patients no significant differences were detected in values of ABPM parameters between the test A and the test B. In the group of patients who received etoposide within the high dose chemotherapy (a component of HSCT procedure) mean values of MSBP, MBP and PP were significantly lower in test B than in test A (MSBP (mmHg) – A: 125.27±10.54, B: 113.29±9.34; MBP (mmHg) – A: 78.34±6.91, B: 70.29±5.52; PP (mmHg) – A: 46.83±5.39, B: 32.11±5.40; p<0.05). In the group of patients receiving carmustine (a component of high dose chemotherapy within the HSCT procedure) mean values of MSBP and PP were significantly higher in test B than those in test A (MSBP (mmHg) – A: 112.94±8.93, B: 129.85±10.12; PP (mmHg) – A: 34.42±5.18, B: 49.85±6.01; p<0.05). Regression analysis allowed to demonstrate that administration of etoposide in the studied group of patients represented an independent risk factor for a decrease and application of carmustine an independent risk factor for an increase in PP directly after completion of high dose chemotherapy, within the HSCT procedure.

Conclusions: The treatment applied in the course of haemopoetic stem cell transplantation in patients with haemopoetic malignancies results in changes of blood pressure, depending on the applied scheme of HDC.

PP.21.21 INFLUENCE OF CENTRAL AORTIC PRESSURE ON NOCTURNAL BLOOD PRESSURE PATTERN AND MORNING SURGE

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Objective: Blood pressure (BP) is the main variable involved in hypertension prognosis. However, hemodynamic load imposed by increased stiffness of large central arteries may play a decisive role. BP variability is associated with target organ damage and high cardiovascular risk and central aortic pressure (CAoP) is emerging as a promising tool in diagnosis and stratification assessment. Objectives: to determine the importance of the elevation of CAoP on nocturnal BP behavior and morning surge.

Design and method: BP was measured and classified according to ESH/ESC 2013 Guidelines. CAoP was measured with a tonometer and Anglo Cardiff study values were considered as references. Ambulatory BP Monitoring (ABPM) was performed with a validated device and the threshold levels of the European Society of Hypertension Working Group on BP were considered. Statistical analysis: continuous variables are reported as means with standard deviations, and discrete variables as absolute values and percentages, student test for differences in means and proportions was applied, Statistical significance was considered p value < 0.05.

Results: 51 patients (p) were included, 33 p (64,7 %) males, mean age 48,3+-13,5 years; 16 p (31,4 %) had elevated (e) CAoP while 35 p (68,6 %) normal (n) CAoP. Consultory room BP was 135+-11,6/81+-7 mmHg in eCAoP p and 138,6+-10,1/80,1+-8 mmHg in nCAoP (p=NS); 24 hours ABPM was 136,9+-12,1/81+-11,4 mmHg in eCAoP and 135,8+-9,6/80,1+-8,3 mmHg in nCAoP p. Consultory room heart rate was 71,4+- 13,9 beats/min in eCAoP p and 74,2

+- 11,2 beats/min in nCAoP (p=NS). There were no differences in sex, type 2 diabetes, dyslipidemia smoking frequencies and mean age between groups. Non dipper systolic BP pattern was observed in 7 p (43,8 %) with eCAoP and 9 p (25,7 %) nCAoP and positive morning surge was observed in 14 p (87,5 %) with eCAoP and 23 p (59 %) nCAoP (p<0,01). The mean systolic deep was 12,3+-7,6 mmHg in eCAoP p and 14,7+-7,6 mmHg in nCAoP p.

Conclusions: BP variability is increased in patients with an elevated CAoP which is characterized by higher frequency of non-dipping nocturnal BP pattern and positive morning surge.

PP.21.22 ASSESSMENT OF SHORT-TERM BLOOD PRESSURE VARIABILITY AND CIRCADIAN PATTERN OF AMBULATORY BLOOD PRESSURE IN HYPERTENSIVE VS NORMOTENSIVE PATIENTS

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Objective: To demonstrate the difference between hypertensive vs. normotensive patients in relation to the measurement of short - term blood pressure variability (STBPV) and the circadian pattern of blood pressure (CPBP).

Design and method: 385 patients with a mean age of 48.55 ± 14.33 years, BMI: 30.77 ± 5.50 Kg/m², 51.5% female who underwent ambulatory blood pressure (BP) monitoring. The sample was divided in: group A: patients with systolic blood pressure (SBP) >= 130 mmHg and/or diastolic blood pressure (DBP) >= 80 mmHg and group B: patients with BP < 130/80 mmHg. Systolic and diastolic blood pressure variability (BPV) was obtained by calculating the: standard deviation (SD) of 24 - hour, day, and night mean values. The daytime and nighttime systolic and diastolic BPV > 15 and > 10 mmHg, respectively, was defined as increased. The CPBP was assessment using the ESH recommendations.

Results: The average of the STBPV was significantly higher in the group A compared with the group B: SBP 24 - h SD (13.67 ± 3.64 vs. 12.79 ± 2.77 mmHg), DBP 24 - h SD (10.95 ± 2.32 vs. 9.95 ± 1.96 mmHg), SBP day SD (13.09 ± 3.98 vs. 12.25 ± 3.11 mmHg), DBP day SD (9.98 ± 2.61 vs. 9.30 ± 2.08 mmHg), SBP night SD (10.39 ± 3.85 vs. 9.41 ± 3.04 mmHg), DBP night SD (9.12 ± 6.19 vs. 7.71 ± 2.35 mmHg), (p < 0.05, all comparisons). No significant differences were found between two groups in relation to increased of 24 - h and daytime BPV, but at nighttime only difference were observed in the diastolic BPV which was significantly higher in the group A: DBP variability (>10 mmHg) (29% vs.15%, p= 0.002). In both groups the most common circadian pattern (CP) for SBP was the non-dipper, while for DBP was dipper.

Conclusions: The hypertensive patients (HP) were who had the greatest BPV. In both groups the CP for SBP was non dipper which increases cardiovascular risk in HP, whereas in normotensive patients could represent a possible onset of hypertensive disease.

PP.21.23 ARE THE GENDER DIFFERENCES A DETERMINANT FACTOR IN THE SHORT - TERM BLOOD PRESSURE VARIABILITY IN HYPERTENSIVE PATIENTS?

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Objective: To determine whether gender differences in untreated hypertensive patients (UHP) is a determinant factor in the short - term blood pressure variability.

Variable	SBP 24h	DBP 24h	PP 24h	SBP 24h SD	DBP 24h SD	SBP day SD	DBP day SD	SBP night SD	DBP night SD
Group A n= 103	128.86±14..52	84.58±6..57	45.2±7.92	14.39 ± 3.81	11.08 ± 2.34	14.06 ± 4.0	10.48 ± 2.06	10.79 ± 4.36	8.43 ± 2.74
Group B n= 97	129.88±10.44	87.80±7.33	42.04±7.47	12.91 ± 3.31	10.80 ± 2.30	12.05 ± 3.70	9.44 ± 2.47	9.97 ± 3.19	9.86 ± 8.40
P	0.57	**0.001**	**0.004**	**0.004**	0.40	**0.001**	**0.005**	0.13	0.10

Design and method: Two hundred UHP were divided according to the gender in 02 groups: (Group A: female gender, n= 103, mean age 51.90 ± 13.06 years, BMI: 29.67 ± 5.62 Kg/m²) and (Group B: male gender, n= 97, mean age 45 ± 14.84 years, BMI: 30.77 ± 5.50 Kg/m²). The 24 - hour ambulatory blood pressure monitoring (ABPM) was measured by (MOBIL - O - GRAPH, one reading every 20 min for 24 h). The short - term systolic and diastolic blood pressure variability (BPV) was obtained by calculating the: standard deviation (SD) of 24 - hour, day, and night mean values.

Results: To compare the results obtained by ABPM in the group A vs. group B, the only variable in which significant differences was found were: DBP 24 - h (84.58 ± 6.57 vs. 87.80 ± 7.33 mmHg, p= 0.001), PP 24 - h (45.2 ± 7.92 vs. 42.04 ± 7.47 mmHg, p= 0.004), SBP 24 - h SD (14.39 ± 3.81 vs. 12.91 ± 3.31 mmHg, p= 0.004), SBP day SD (14.06 ± 4.0 vs. 12.05 ± 3.70 mmHg, p= 0.001), DBP day SD (10.48 ± 2.65 vs. 9.44 ± 2.47 mmHg, p= 0.005).

Conclusions: The systolic BPV of 24 - h and systolic/diastolic daytime BPV in female group (FG) was significantly larger than in the male group. Also PP was higher in the FG which represents possible surrogate marker associated with increased of BPV.

PP.21.24 DIURNAL PROFILES EVOLUTION IN HYPERTENSIVE PATIENTS USING ANGIOTENSIN RECEPTOR BLOCKER VERSUS ULTRASELECTIVE BETA BLOCKER THERAPY

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Objective: It is known that a change of the abnormal Blood Pressure (BP) diurnal profile extreme-dipper into a normal diurnal dipper BP profile offers a cardiovascular protection against ischemic events and vascular dementia. The aim of this study was to compare the effects of Angiotensin Receptor Blocker (ARB) versus ultraselective Beta Blocker (BB) therapy on the evolution of diurnal profile types in hypertensive patients.

Design and method: A prospective study with a twelve-month Ambulatory Blood Pressure Monitoring (ABPM) follow-up was conducted on hypertensive patients with the evaluation of diurnal profile defined by diurnal index for systolic (IDTAS) and diastolic (IDTAD) blood pressure. According to this index, the patients were divided as: dipper(D), non-dipper(ND), reverse-dipper(RD), and extreme-dipper(ED). The study group consisted of 80 patients, randomly assigned to ARB (42) or BB (38) patients. SPSS 17.0 software was used for statistics.

Results: The diurnal profiles for IDTAS and IDTAD were similar for both therapies (ND to D, ED to D, RD to ND) without statistically significant differences (p>0.05) at the twelve-month follow-up. Extreme dipper profile defined by IDTAS completely disappeared by using both therapies. Extreme dipper profile defined by IDTAD completely disappeared by using the ARB therapy.

Conclusions: This study proved that 12 month therapy with ARB versus BB therapy had the same effects on abnormal diurnal profiles (ND ,ED, RD) evolution. A more aggressive effect on extreme dipper profile defined either by diurnal index for systolic or diastolic blood pressure was presented by ARB therapy; this change assures a cardiovascular protection against ischemic events or vascular dementia.

PP.21.25 RELATIONSHIPS BETWEEN SHORT-TERM BLOOD PRESSURE VARIABILITY AND EARLY RENAL DYSFUNCTION IN ESSENTIAL HYPERTENSIVE PATIENTS

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Objective: Studies investigating the prognostic impications of short–term blood pressure (BP) variability (STBPV), expressed a standard deviation (SD) and assessed by noninvasive 24-h ambulatory BP monitoring (ABPM), yielded conflicting results. In last years further indices of STBPV have been proposed. Among these, the 24-h BP average real variability (ARV) seems to be associated with an increased cardiovascular risk more closely than the SD. Little is known about the association between mild renal dysfunction (MRD) and STBPV, and particularly between 24-h BP ARV and MRD. Our study was aimed to analise, in a group of essential hypertensive subjects, the relationshisps between MRD and STBPV, expressed as SD of day and night-time BP and as 24-h BP ARV and between these latter, 24-h albumin excretion rate (AER) and estimated glomerular filtration rate (eGFR).

Design and method: We enrolled 178 untreated essential hypertensive subjects, with and eGFR > 60 ml/min/1.73 m2. All the patietns underwent 24-h ABPM. BP readings were performed automatically at 15 min intervals during the day and at 20 min intervals during night-time resting. Moreover, 24-hour AER was determined and eGFR calculated using the CKD-EPI equation. Subjects belonging to the I and II stages of the KDIGO classification of chronic kidney diseases (CKD) were considered as having MRD.

Results: No significant difference was found between subjects with MRD (n =

43) and those without it, regarding all the indices of STBPV examined, except for SD of daytime diastolic BP that was higher (p 0.02) in patients with MRD. However, this difference lost statistical significance after adjustment for age, average daytime diastolic BP, waist circumference and triglycerides. Among the STBPV indices studied, only SD of daytime systolic BP showed a weak (p = 0.03) inverse correlation with eGFR, that disappeared after adjustment for age, gender and average systolic daytime BP in multiple regression analysis. Both 24-h systolic and diastolic ARV did not show significant correlations neither with 24-h AER nor with eGFR.

Conclusions: Our results seem to suggest that in essential hypertensive patients, STBPV, even when expressed by 24-h ARV, does not influence early renal abnormalities.

PP.21.26 THE EFFECT OF ANTIHYPERTENSIVE TREATMENT ON VARIABILITY OF BLOOD PRESSURE

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Objective: Aim of our study was to explore the effect of antihypertensive treatment on variability of blood pressure in essential hypertensive patients.

Design and method: We studied 652 treated or newly diagnosed untreated hypertensive patients (46% male). All patients underwent 24 hour Ambulatory Blood Pressure Monitoring (ABPM). Home Blood Pressure (HBP) was recording in 281 patients (43%). Differences between the variability of 24hour ABPM recordings (awake, asleep, early morning) as well as HBP measurements variability were assessed. Treated patients were receiving all possible antihypertensive treatment as combination or as monotherapy.

Results: Results are shown in Table 1.

	Untreated	Treated	p value
MSBP24	17,1	17,5	NS
MDBP24	12,9	12,7	NS
DSBP	15,9	16,4	NS
DDBP	12,1	12,1	NS
NSBP	13,3	13,2	NS
NDBP	10	9,9	NS
SBPe	14,6	14,6	NS
DBPe	11,2	11,3	NS
SBPh	10,2	9,7	NS
DBPh	6,4	5,9	NS

Variability:
MSBP24=Mean systolic Blood Pressure 24hr, MDBP24=Mean Diastolic BP 24hr, DSBP=Systolic Blood Pressure during Day, DDBP=Diastolic Blood Pressure during Day, NSBP=Systolic Blood Pressure during Night, NDBP= Diastolic Blood Pressure during Night, SBPe= Systolic Blood Pressure during Early Morning, DBPe= Diastolic Blood Pressure during Early Morning, SBPh=Systolic Blood Pressure at Home, DBPh= Diastolic Blood Pressure at Home, NS=Non Significance.

Conclusions: Antihypertensive treatment does not affect variability of blood pressure in treated hypertensive patients, received as monotherapy or as combination.

PP.21.27 RELATIONSHIP BETWEEN BLOOD PRESSURE VARIABILITY AND CARDIOVASCULAR RISK FACTORS IN ARTERIAL HYPERTENSION

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Objective: Ambulatory blood pressure monitoring (ABPM) is the most efficient way for assessing the variability of blood pressure (BP) which is a strong predictor for future clinical cardiovascular outcomes. The aim of the study was to assess the association between the non-dipping profile and cardiovascular risk factors.

Design and method: Our 3 year retrospective study included 465 hypertensive patients who performed an ABPM. All patients underwent the following: clinical examination; evaluation of cardiovascular risk factors – smoking, chronic ethanol consumption, type 2 diabetes mellitus (DM), obesity, history of stroke; echocardiography for the assessment of left ventricular hypertrophy (LVH); determination of biochemical markers – total cholesterol, triglycerides, urea, creatinine, glomerular filtration rate (GFR). The non-dipping (ND) profile was defined by a decrease of nocturnal BP values < 10% compared with daytime average values as determined by ABPM. The ND group (n=204) was compared with the dipping (D) group (n=261), the two groups being age- and sex-matched.

Results: Mean age was 56.66 ± 10.45 years in D group with 38.16% males and 59.29 ± 9.69 years in ND group with 41.66% males. After logistic regression, the ND profile was strongly associated with chronic ethanol consumption (OR 1.69; 95% CI 1.10-2.59; p=0.01) and obesity (OR 1.20; 95% CI 1-1.44; p=0.03) and type 2 DM (OR 1.48; 95% CI 0.98-2.23; p=0.05). There were no statistical differences regarding smoking status, stroke or LVH between the two groups. Regarding biochemical markers, the ND profile was associated with higher values of total cholesterol (OR 1.0066; 95% CI 1.0023-1.0110; p=0.002) that means each rise with 10 mg/dl results in 6% additional risk for developing ND profile. The values of triglycerides, urea, creatinine or GFR did not differ significantly between the two groups.

Conclusions: In our study, chronic ethanol consumption, obesity, presence of type 2 DM and high values of total cholesterol are independent cardiovascular risk factors for the non-dipping profile.

PP.21.28 DYNAMICS IN DIURNAL PROFILE AND VARIABILITY OF BLOOD PRESSURE IN PATIENTS WITH COPD AND CHOLELYTHIASIS AFTER CHOLECYSTECTOMY

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Objective: To evaluate dynamics in diurnal profile and variability of blood pressure in patients with chronic obstructive pulmonary disease (COPD) and cholelythiasis before and after cholecystectomy.

Design and method: 218 patients who underwent endoscopy cholecystectomy were examined. In 85.3% of cases patients had arterial hypertension in anamnesis. Patients were divided into two groups depending on bronchial obstruction severity. The 1st group consisted of 120 patients with FEV-1<80%, and the 2nd group was of 98 patients with FEV-1>=80% (according to spyrometry). Groups were equal in age, sex, comorbidities, risk factors, BP, therapy. All patients had diurnal BP monitoring in 3 days before and than, during 3 days after cholecystectomy. Average age was 59,3±8,7 years. Average office systolic BP was 154,9+16,7 mm Hg, office diastolic BP was 98,2+10,4 mm Hg, average FEV-1 was 78,6+18,2%.

Results: After cholecystectomy there were revealed reliable increase of average diurnal, average daily and night both systolic and diastolic BP, and they were more evident in 1st group (p<0,001). Circadian rhythm was more changed through increase of «Non-Dipper» and «Night-peaker» in 1st group compared with 2nd group (p=0,018). Increase of SDdsBP and SDddBP variability was significantly more in 1st group 7,5+1,2% vs 2,5+0,8% and 3,4+1,1 vs 1,2+0,2 %, respectively (p<0,001 in all). There were no reliable differences in SDnsBP SDndBP dynamics between the groups. Dynamics in increase of real average daily BP variability was significantly higher in 1st group than in 2nd: 5,8+1,4% and 2,9+0,8% for systolic BP; 3,5+1,0 and 1,6+0,4% for diastolic BP (p=0,014; p=0,011, respectively).

Conclusions: Presence and severity of bronchial obstruction in patients with COPD and cholelythiasis influences negatively on diurnal BP monitoring parameters. It is characterized with more evident increase of average daily (and both daily and night) BP, increase of «Non-Dipper» and «Night-peaker», and also, with increase of SDdsBP, SDddBP, AVR24.

PP.21.29 SHORT-TERM BLOOD PRESSURE VARIABILITY AS A CARDIOVASCULAR RISK IN ESSENTIAL HYPERTENSION: DIFFERENCES ACCORDING TO CLASSIFICATIONS OF BLOOD PRESSURE ABSOLUTE VALUE

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Objective: Increased short-term blood pressure (BP) variability has been highlighted as a novel risk for cardiovascular disease. In this study, the associations of short-term BP variability with cardiovascular structures were analyzed according to classifications of BP absolute value in essential hypertensives (EHT).

Design and method: In 222 untreated EHT (mean age 55±11 years, 42.8% women), ambulatory BP monitoring was performed to estimate BP and the coefficient variation of systolic BP (SBP-CV) during the daytime. Left ventricular mass index (LVMI) and carotid intima-media wall thickness (IMT) were also evaluated by echocardiography and ultrasonography, respectively.

According to 24-hour BP, EHT were divided into 4 groups: 33 EHT with BP less than 130/80 mmHg (N), 71 with BP of 130-149/80-89 mmHg (G1), 84 with BP of 150-169/90-99 mmHg (G2) and 34 with BP 170/100 mmHg or more (G3).

Results: Daytime systolic BP correlated positively with LVMI and IMT in all four BP groups (r = 0.48, 0.36 in N; r = 0.22, 0.24 in G1; 0.33, 0.30 in G2; r = 0.43, 0.35 in G3, respectively). By contrast, daytime SBP-CV correlated positively with LVMI and IMT in both G2 and G3 groups (r = 0.27, 0.27 in G2; r = 0.31, 0.42 in G3, respectively), but did not so in either N or G1 group. Thus, the correlations between daytime SBP-CV and these cardiovascular structural indices were confined to EHT with 24-hour BP 150/90 mmHg or more. Furthermore, in EHT with 24-hour BP 150/90 mmHg or more, multiple regression analysis revealed that SBP-CV was an independent determinant for both LVMI and IMT together with daytime systolic SBP and age (r^2 = 0.21, 0.29, respectively).

Conclusions: These data indicate in EHT, that the risk of increased short-term BP variability for cardiovascular disease could be potentiated along with the elevations in BP absolute value.

PP.21.30 ANGIOTENSIN II RECEPTOR BLOCKER AND CALCIUM CHANNEL BLOCKER IN THE PATTERN OF NOCTURNAL DIPPING

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Objective: Nocturnal blood pressure (BP) decrease less than 10% is known as a nondipping BP pattern. Nondipping BP has been shown to be associated with target organ damage and poorer cardiovascular outcomes. It was suggested that the angiotensin II receptor blockers (ARBs) could improve nocturnal dipping by enhancing daytime sodium excretion. We elucidated the effects of ARBs and calcium channel blockers (CCBs) on 24-hour ambulatory BP monitoring (ABPM) in untreated hypertensives.

Design and method: Fifty patients with untreated hypertension (male:female =30:20; mean age 51 ± 14 years; the mean duration of medication 344 days) were examined by ABPM before and after antihypertensive medication. We divided those patients into two groups [CCB group treated with CCBs (male:female=9:11; mean age= 53 ± 15 years) and ARB group treated with ARBs (male:female=21:9; mean age=49 ± 13 years)]. The δ dipping was defined to [nocturnal BP decrease (%) after medication] – [nocturnal BP decrease (%) before medication].

Results: There were no significant differences in the clinical characteristics between two groups. The follow up nocturnal systolic and diastolic BP decrease were significantly smaller in CCB group than in ARB group (9.07 ± 10.16 vs. 14.33 ± 6.73, p=0.032 in systolic BP; 10.12 ± 9.77 vs. 16.54 ± 6.63, p=0.008 in diastolic BP). The δ dipping was significantly smaller in CCB group than in ARB group (-1.46 ± 7.44 vs. 4.13 ± 7.99, p=0.018 in systolic BP; -2.81 ± 7.78 vs. 5.11 ± 8.64, p=0.002 in diastolic BP).

Conclusions: ARBs can effectively improve nocturnal dipping in untreated hypertension.

PP.21.31 IN ADULT KAZAKHS NON-DIPPING BLOOD PRESSURE VARIATIONS ARE DERIVED FROM DECREASED DAYTIME PHYSICAL ACTIVITY AND INCREASED NIGHTTIME SYMPATHETIC ACTIVITY

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Objective: Many non-dippers and hypertensives have been documented amongst the elderly Kazakhs in Xinjiang, China. The purpose of this study was to determine whether similar numbers of non-dippers exist among middle–aged Kazakhs, to compare their blood pressure (BP) parameters with those of dippers and to clarify the mechanism responsible for non-dipping BP variations.

Design and method: We performed ambulatory BP monitoring (ABPM) and defined non-dippers as individuals who exhibited a nighttime systolic BP (SBP) drop of <10% compared with their daytime SBP. The subjects were enrolled and divided into two groups: 1.Kazakhs that exhibited dipping BP variations (30-35-years-old, n=44), 2.Kazakhs that displayed non-dipping BP variations (30-35-years-old, n=47). We monitored the subjects' physical activity (ACT) with accelerometry and assessed their autonomic nerve activity by performing a frequency domain analysis of their heart rate variability (HRV). We analyzed the subjects' SBP variations with the maximum entropy method (MEM).

Results: The dippers and non-dippers accounted for 48% and 52% of the subjects, respectively. MEM analysis revealed that the SBP variations of the non-dippers exhibited a 24-hour periodicity with a very weak power spectral density (PSD) as well as an ultradian periodicity. The SBP variations of the dippers displayed a 24-hour periodicity with a stronger PSD. The daytime ACT of the non-dippers was lower than that of the dippers (non-dippers vs. dippers, 0.8835±0.3223 vs. 1.0206±0.3879 intensity/2 min, P=0.0001). The low frequency (LF)/high frequency (HF) HRV ratio of the non-dippers was greater than that of the dippers at nighttime (non-dippers vs. dippers: 1.9859±0.5896 vs.1.4000±0.3416, P=0.0001). Conversely, the HF/(LF+HF) value of the non-dippers was generally lower than that of the dippers throughout the 24-hour examination period (non-dippers vs. dippers, P<0.0001).

Conclusions: Non-dipping Kazakhs demonstrated SBP variations that exhibited a 24-hour periodicity with a weak PSD. Compared with the dippers, the physical activity of the non-dippers was reduced during the daytime. In addition, their cardiac sympathetic nerve activity was increased at nighttime, and their cardiac parasympathetic nerve activity was generally decreased.

PP.21.32 DOES BLUNTED NOCTURNAL BLOOD PRESSURE RELATE TO INCREASED LEFT VENTRICULAR MASS INDEX EVEN IN NORMOTENSIVE SUBJECTS?

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Objective: Non-dipping pattern has known to be related the increased left ventricular mass index (LVMi) in hypertensive patients. However, there has been no available data concerning normotensive patients. In this study, we evaluated the influence of nocturnal dipping (ND) to the LVMi in the subject with normotension and with uncomplicated hypertension (HT).

Design and method: Total of 1,054 subjects who had no medical history of myocardial infarction, cerebral infarction, valvular heart disease and end-stage renal disease from the Korean Ambulatory Blood Pressure Registry was recruited. ND was calculated as {daytime systolic blood pressure (SBP) - nocturnal SBP)}/daytime SBP × 100. They were divided into two groups according to the ND: the dipper, ND>= 10 (n= 522) and the non-dipper, ND< 10 (n = 532). Hypertension was defined as medical history of HT or high average daytime ambulatory BP; average daytime systolic BP >= 135 mmHg or average daytime diastolic BP >= 85 mmHg. Total 189 (17.9%) subjects showed normotension and 865 subjected (82.1%) were compatible with HT.

Results: Daytime systolic and diastolic BP were lower in the non-dipper (136.7±16.8 vs 140.0±15.9, 85.7±11.9 vs 88.6±11.7 mmHg; both, p<0.001). There was no differences in sex, body mass index (BMI), ejection fraction, e/e' ratio between the groups. Non-dipper was associated with the increased LVMi (97.2±27.6 vs 92.9±27.4 g/m2, p=0.012). However, relative wall thickness (RWT) and left ventricular geometry did not show significant difference between the groups (p=0.479, p=0.284). These results were similar in both normotension and HT subgroup analysis; no differences in RWT and left ventricular geometry according to ND. Non-dipper had higher LVMi in both normotension and HT (p=0.028, p=0.047). After adjusting covariate (sex, age, daytime SBP, BMI, BP variability), normotension subgroup showed higher adjusted mean of LVMi in non-dipper (93.2±2.3 vs 86.6±2.7 g/m2) without statistical significance (p=0.075). Contrary, hypertensive subjects showed higher adjusted mean of LVMi in non-dipper (98.3±1.3 vs 93.5±1.3 g/m2) with statistical significance (p=0.011).

Conclusions: Even in normotensive subjects, blunted ND of SBP was associated with increasing LVMi. Large-scale study concerning normotensive subject needs to be further investigated.

PP.21.33 ISOLATED NOCTURNAL BLOOD PRESSURE ASSOCIATES WITH HIGHER PREVALENCE OF TARGET ORGAN DAMAGE

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Objective: Ambulatory blood pressure monitoring (ABPM) better estimates cardiovascular risk and target organ damage (TOD) than office blood pressure. There is controversial about predictive value of isolated nocturnal hypertension

(INH) defined as (nocturnal mean BP > 120/70 mmHg and diurnal mean BP < 135/85 mmHg) compared to isolated diurnal hypertension (IDH).

Design and method: A cross-sectional study was conducted in naive hypertensive subjects. 48-hour BP monitoring was performed using a validated device (Spacelabs 90207). Diurnal and nocturnal mean of BP included into analysis. Following examinations were held: carotid artery ultrasound with intima/media thickness (IMT), carotid femoral PWV by Sphygmocor At Cor® and oscillometric measurement of ABI. Blood and urine samples were used for the determination of glomerular filtration rate by MDRD equation (GFR) and microalbuminuria (MAU). Left ventricular hypertrophy was diagnosed according to ECG (Sokolow-Lyon index, Cornell voltage and product).

Results: A total of 331 hypertensive subjects were enrolled in the study (21.75% with INH and 16.01% with IDH). There were differences between both groups on gender distribution, body mass index and waist circumference but only statistically significant regarding mean age (INH: 57.9 years Vs IDH: 47.7 years). Prevalence of TOD was higher on those with INH (52.77%) compared with IDH (26.41%).
Most prevalent TOD was high PWV (INH: 63.15%; IDH: 71.42%) and increased IMT (39.47% and 35.71% respectively).

Conclusions: Slightly more than one fifth of hypertensive subjects from this cohort suffers from INH. They are a little bit elder than others and also shows higher prevalence of TOD. Neither office BP nor home BP are able to identify those subjects so ABPM is essential to overcome this limitation.

PP.21.34 DISTRIBUTION OF CENTRAL SYSTOLIC BLOOD PRESSURE AND RELATIONSHIP WITH TRADITIONAL CARDIOVASCULAR DISEASE RISK FACTORS AMONG MIDDLE-AGED POPULATION OF CHINA

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Objective: To investigate the distribution of Central systolic blood pressures (CSBP) values estimated by BPro® device with A-Pulse CASP® software, and to examine the relations of CSBP and other risk factors of cardiovascular disease in Chinese middle aged population.

Design and method: A cross-sectional survey on risk factors of cardiovascular disease across China was conducted in 2009-2010.There were 12 different research populations, including southern and northern, urban, and rural in different parts of China, who were selected based on the economic and social development level and the basis of previous research.

Results: In our study, 9,113 participants were eligible for analysis after excluding insufficient data. The CSBP was 119.46 mmHg in males and 119.81 mmHg in females. The CSBP level is lower in the urban population than those in rural ($P < 0.05$), and is higher in the north population than those in south ($P < 0.05$). SNK test showed the CSBP in Mongolian, Hazak and Akha was lower than Han population, Tibetan and Uyghur. The multivariate linear model showed CSBP was positively associated with age, BMI, SBP and DBP, negatively associated with HR for both gender. Alcohol and uric acid were positively associated with CSBP in males.

Conclusions: The distribution of CSBP level might provide more information for establishing reference values. Additionally, CSBP might improve the cardiovascular and related diseases risk prediction or as an early predictor for these diseases, of course which hypothesis still need prospective cohort study to affirm.

PP.21.35 NON DIPPING PATTERN OF BLOOD PRESSURE IS A PREDICTOR OF CHRONIC RENAL DISEASE

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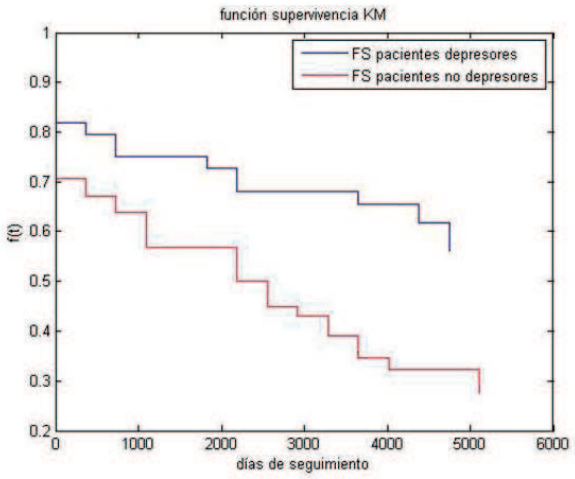
Objective: To evaluate the dipping status as a risk factor of worsening kidney function and development of chronic renal disease.

Design and method: Adult patients with clinical diagnosis of hypertension send to the hypertension unit of Hospital Universitary Fundation Alcorcon with 24h-ABPM and with at least five yearsof creatinine determinations were included. The 24h-ABPM was performed with an oscillometric device(SpaceLabs 90207). A nondipping pattern was defined when nocturnal systolic BP dip was <10% of daytime systolic BP. Serum creatinine (Cr) was measured and we estimated the eGFR by using MCRD formula. Bivariate comparisons between patients dipper and non-dipper were performed To value if dipping status is predictor of renal insufficiency, a Kaplan-Meier survival study and Cox regresión were performed.

Results: Between 2000 and 2007 year, 1258 patients were performed ABPM but only in 128 it was possible to find five years of creatinine determinations. 25 were excluded for possessing an insufficient number of BP, we analized 103. There were 5869 Cr determinations, with a mean of 57/patient and a follow of 11.71 years (6-14 years). The mean age was 59,7 years and 52 % they were males. 38.2 % have 24h-ABPM>130/80mmHg, 90 % have treatment , 51 % were diabetics and 33 % have ECV. The prevalence of nondipping was 56%. All the patients had a normal renal function when ABPM was performed and 54.9 % developed renal insufficiency in the follow-up. The patients with chronic renal disease had a lower decrease of systolic and diastolic BP in de ABPM. When we compared the progression to renal insufficiency, nondipping was associated independently with higher rates of chronic renal disease . The analysis multivariant revealed that Diabetes increase the risk of renal insufficiency 73 %, previous ECV 87 % and non-dipper 94 %, whereas the sex woman decrease 49 % the risk.



	β	exp(β)	p-valor
Woman Sex	-0.72	0.49 (0.27,0.86)	0.01
Diabetes Mielitus	0.55	1.73 (1.02,2.95)	0.04
Cardiovascular Disease	0.64	1.87 (1.08,3.34)	0.02
Non dipper	0.66	1.94 (1.12,3.36)	0.01

Conclusions: The non-dipper status is a predictor of worsening kidney function and development of chronic renal disease and carries an increase of risk greater that diabetes or ECV antecedent.

PP.21.36 VERAPAMIL AND BARORECEPTOR STIMULATION BLOOD PRESSURE BUFFERING, ARTERIAL BAROREFLEX VS. VASCULAR BLOOD PRESSURE CONTROL MECHANISM

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Objective: There are potentially three measures of blood pressure (BP) that contribute to the adverse effects of arterial hypertension: the average or 'true', level; BP diurnal variation; and BP short-term variability. We compared sinocarotid baroreceptors magnetic stimulation and a voltage-gated calcium channel blocking agent, verapamil effect on sudden elevation in BP.

Design and method: Forty four experiments were performed in conscious rabbits sedated using pentobarbital intravenous (i.v.) infusion (5 mg/kg/hour). Mean femoral artery blood pressure (MAP), heart rate and ear lobe skin microcirculatory blood flow, estimated using microphotoelectric plethysmography (MPPG), were simultaneously measured after a 40 min exposure of the sinocarotid baroreceptors to 350 mT SMF, generated by Nd–Fe–B magnets, or 30 min of verapamil i.v. infusion (20 μg/kg/min). Arterial baroreflex sensitivity (BRS)

was measured by the changes in heart rate and MAP after intravenous (i.v.) bolus injections of sodium nitroprusside and phenylephrine.

Results: Both interventions significantly decreased systemic MAP (-6.2%, -18.2%) and increased microcirculatory blood flow (+23.0%, +33.1%), SMF and verapamil respectively. The decrease in phenylephrine-induced abrupt elevation in MAP (ΔMAPae) was significantly larger after verapamil infusion (-56.8%) then after SMF exposure (-21.9%). ΔMAPae inversely correlated with verapamil-induced significant increase in ΔMPPG ($r = 0$-$.53$, $p < 0.000$) and with SMF-induced significant increase in ΔBRS ($r = -0.47$, $p < 0.016$).

Conclusions: Our results suggest that i.v. verapamil BP buffering effect was more effective than SMF baroreflex-mediated. Verapamil, by blockade of vascular smooth muscle cell calcium channels, probably exploits a synergistic effect with vascular short-term BP control mechanism that relies on endothelial NO production in response to enhanced vascular shear stress, leading to decrease in vascular smooth muscle calcium content and increment in vascular compliance to BP challenge. This cooperative vascular calcium depletion may result in more effective BP buffering then sinocarotid baroreceptor magnetic stimulation potentiated arterial baroreflex sympathetic activity withdrawal-based BP control mechanisms. The coupling of enhanced BP buffering and microcirculatory blood flow, by both interventions, might exert additional synergistic cardioprotective effect in an array of cardiovascular diseases where enhanced BP variability and microvascular dysfunction increase the risk of morbidity and mortality substantially.

PP.21.37 CIRCADIAN RHYTM DISTURBANCES IN OLDER HYPERTENSIVE PATIENTS. INCREASE OF OVERALL MORTALITY

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Objective: Blood pressure values during the day are not constant. Blood pressure (BP) is significantly variable over time, the actual current BP level is influenced by many factors, some of which are accidental, but many of them are not affected by random effects, and are rhythmically repetive with different interval. Similar to many biological functions of the body, BP is affected mostly by circadian rhythm. In our five-year retrospective study in a group of older hypertensive patients we were observing the differences in diurnal index and differences between dippers, non-dippers and reverse-dippers, related to overall mortality.

Design and method: In our study group we included 170 hypertensive patients, 34 (20 %) male and 136 (80 %) female, in age 75 to 84 years, enrolled in the years 2005 to 2007, with the ambulatory blood pressure monitoring (ABPM) at the beginning of observation. The study group was divided according the ABPM results into dippers group (40 patients, 23.5 %), non-dippers group (65 patients, 38.2 %) and reverse-dipppers group (65 patients, 38.2 %). ABPM was performed with a Cardiosoft Tonoport V, General Electric, USA, equipment.

Results: During the 5-year observation period after ABPM we observed 69 deaths (40.9 %). 10 deaths (25 %) was in the dippers-group, 23 (35.4 %) in the non-dippers group and 36 (55.4 %) in the reverse-dippers group.

Conclusions: Between the groups divided according to the diurnal index to dippers, non-dippers and reverse-dippers, there was observed a significant difference in the number of reported deaths. The absence of normal physiological diurnal index, drop in BP during night period, was associated with higher mortality. We confirmed that disturbed diurnal rhythm is a risk factor for all-cause mortality, even in specific hypertensive population aged over 75 years. ABPM allows to bridge the history of organ damage (myocardial infarction, heart failure, renal failure) with clinical outcome due to analysis of circadian blood pressure changes. ABPM is therefore a important diagnostic tool for the selection of the most cardiovascular risk exposured patients.

PP.21.38 CHRONOTHERAPEUTIC APPROACH IN VALSARTAN-TREATED HYPERTENSIVE PATIENTS WITH NON-DIPPER BLOOD PRESSURE RHYTHM

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Objective: Our previous study using stroke-prone spontaneously hypertensive rats showed that the blood pressure (BP)-lowering effect of angiotensinII receptor blocker valsartan and survival period of these animals depended on dosing time. However, the effects of another ARB, olmesartan, were not influenced by dosing time. Based on these observations, we speculated that the dosing time-dependent effects of valsartan and olmesartan differed in hypertensive patients. This study was undertaken to evaluate the hypothesis.

Design and method: Hypertensive patients were given valsartan once daily in the morning for >2 months, and daily BP profiles were evaluated using an ambulatory BP monitoring device. In patients judged to have a non-dipper BP rhythm (poor BP reduction at night), the dose regimens were switched to valsartan-evening (E) (n=11), olmesartan-morning (M) (n=11) and olmesartan-evening (E) (n=12) for 4 months. Daily BP profiles were also evaluated at the end of the study. Estimated glomerular filtration rate (eGFR) was calculated before and 4 months after switching the dose regimens.

Results: Percent BP reduction during sleep significantly increased at 4 months after switching the dose regimen in each group. Systolic BP (SBP) during sleep slightly decreased in the valsartan-E group, and significantly decreased in the olmesartan-M ($p<0.01$) and olmesartan-E ($p<0.05$) groups (mean SBP decrease during sleep; -4.1 mmHg, -11.1 mmHg and -8.3 mmHg in the valsartan-E, olmesartan-M and olmesartan-E groups, respectively). The eGFR increased in groups treated with olmesartan, but not valsartan. As a whole, significant negative correlation was detected between SBP during sleep and the eGFR ($r=-0.243$, $n=68$, $p<0.05$).

Conclusions: These data indicate that in the non-dipper BP hypertensive patients with valsartan in the morning, switching from morning dosing to evening dosing of the drug might not necessarily provide further advantage for hypertension therapy. On the other hand, switching to olmesartan in the morning and evening in these patients could exert protective effects against hypertension-induced organ damages.

PP.21.39 THE INFLUENCE OF MORNING AND EVENING INTAKE OF VERAPAMIL ON BLOOD PRESSURE VARIABILITY IN HYPERTENSIVE PATIENTS

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Objective: Blood pressure (BP) variability (VAR) may be an important parameter for the assessment of efficiency of antihypertensive therapy. However, BP VAR was not a subject of special investigation in cronotherapy trial in hypertension. The aim of the study was to estimate the influence of morning (M) vs. evening (E) of verapamil (isoptin SR - ISR) intake on BP VAR in stable hypertensive patients (pts).The study protocol included the compliance assessment by pharmacokinetics investigation (PKI).

Design and method: Twenty pts (average age 58.4±10.4, 10 males, mean day-time ambulatory BP(ABP)>135/85 mm Hg in each pt) were enrolled into open cross-over randomized study (mean daily dose – 240.0±16.3 mg).The study consisted of the initial wash-out period (2 weeks), two treatment courses (3 weeks) and the week interval between courses. ISR was administered in the M - at 9.00 or in the E - at 21.00. ABPM with Spacelabs 90207 was performed before wash-out and simultaneously with the PKI at the end of each of treatment course. ISR concentration was determined 13 times during 24 hours. ABPM-FIT and CV-SORT software was used for the preliminary ABP data analysis including Fourier transformation. We analyzed more .than 100 parameters, including BP indices (systolic (S), diastolic (D) and mean (M)), BP VAR, maximal levels. Maximal plasma concentration (C max) of ISR and half-elimination time (T1/2) were determined at PKI.

Results: The dynamics of some indices of ABP and BP VAR is shown in table1. Only E intake of ISR caused significant decrease of SBP VAR and MBP VAR at night (n). ISR intake also significant reduced SBP and MBP maximal levels at night (by 13-14 mm Hg).Cmax of ISR after M intake was 239.7±152.3 ng/ml, after E intake-148.6±107.4 ng/ml ($p<0.01$). T1/2 was 12.5±3.5 hours and 22.6±15.2 hours ($p<0.05$) respectively.

Table 1. Dynamics of some indices of ABPM in M vs. E regimen of ISR treatment

Index	SBPn	MBPn	VAR SBPn	VAR MBPn
baseline	132.0±3.5	97.5±2.2	10.4±0.7	9.8±0.6
M	126.5±3.3	92.4±2.4	11.0±0.7^	9.5±0.7**^^
E	122.3±3.1	89.7±2.2	8.4±0.7*^	6.7±0.6^^

Treatment vs. no treatment:*- p< 0.05; ** - p<0.01; M vs. ^- p< 0.05; ^^ - p<0.01.

Conclusions: Changes in BP VAR depends on time of drug intake. Probably this effect may be explained by lower concentration and higher T 1/2 of the drug at bedtime administration.

PP.21.40 THE HYPERTENSIVE RESPONSE DURING TREADMILL EXERCISE AND LEFT VENTRICULAR DIASTOLIC FUNCTION IN PATIENTS WITH NORMOTENSION

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Objective: Hypertension very often accompanies diastolic dysfunction. A high blood pressure response to exercise is future risk of developing hypertension. We investigated the association of the hypertensive response in Treadmill testing and diastolic functionon echocardiographic indices in normotensive patients.

Design and method: Three hundred nineteen consecutive normotensive patients (mean age 54 ± 10.5 years; male: female = 163: 156) who showed negative Treadmill exercise stress echocardiography (TSE) were enrolled. TSE was performed using Bruce protocol. LV diastolic function was assessedbefore exercise. Systolic blood pressure (SBP)response was defined as [exercise SBP] – [resting SBP] and was corrected by the estimated metabolic equivalent (MET).

Results: SBP response corrected by MET was correlated with age (r=0.116, p=0.038), resting diastolic blood pressure (DBP) (r=-0.13, p=0.021), left atrial dimension (LAD) (r=0.146, p=0.009) and early diastolic transmitral velocity/ early diastolic tissue velocity (E/e') (r=0.153, p=0.007). SBP response corrected by MET was associated with E/e' (β=-0.167, p=0.011, adjust R^2 = 0.037) after adjusting for age, DBP.

Conclusions: Hypertensive response to exercise is associated with diastolic dysfunction reflected by echocardiographic index, E/e' in normotensive patients. It suggests that diastolic dysfunction can accompany in normotensive individuals with hypertensive response as well as in hypertensives.

PP.21.41 COMPARISON OF FRAMINGHAM RISK SCORE, MEAN PULSE PRESSURE AND VISIT-TO-VISIT BLOOD PRESSURE VARIABILITY IN PREDICTING CARDIOVASCULAR EVENT AMONG HYPERTENSIVE PATIENTS: A 10-YEAR RETROSPECTIVE COHORT STUDY

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Objective: Cardiovascular event risk can be predicted by using Framingham cardiovascular disease (CVD) risk score. Visit-to-visit blood pressure variability (BPV) is strong predictors of stroke, independent of mean systolic blood pressure (BP) but not sure for the cardiovascular event. Similarly, the role of mean pulse pressure (PP) in predicting the cardiovascular event is still unsettled. We investigated whether visit-to visit BPV and PP are a suitable, simple, noninvasive alternative to predict the cardiovascular event compared to the conventional method of Framingham CVD risk score.

Design and method: This is a retrospective study of a cohort over a period of 10 years. The BP of three visits: i.e. at baseline, 5 years and at 10 years were captured from patient records. Demographic factors, cardiovascular parameters and use of antihypertensive agents were also captured. We used standard deviation (SD) and coefficient as a measure of BPV. SD is calculated as √ [sum(individual BP readings-sample mean BP)2]/ number of visit and coefficient of variation as SD divided by the mean Systolic BP.
Mean PP is defined as sum (Systolic BP -Diastolic BP)/ number of visit.
The total cardiovascular events throughout ten years were captured.

Results: 1547 subjects were in original cohort, 91% (n=1408) had complete BP readings for analysis. The mean age of the participants at baseline was 56.4±9.8 years (ranged 30 -86). 33.8%% were males. The median of the BPV was 9.4(IQR=9.4) mmHg and coefficient of variation was 7.1(IQR6.3) mmHg. The mean score for Framingham CVD risk score was 22±8 and pulse pressure was 56±11mmHg. There is a significant relationship found between Framingham CVD risk score and mean pulse pressure. Every one increased in Framingham CVD risk score, the CVD is expected to increase by 0.05(p=0.001). Every one mmHg increased in mean pulse pressure, the cardiovascular event is expected to increase by 0.03(p=0.034).

Conclusions: Our results suggesting that PP may be of use for initial screening of cardiovascular risk as it is non-invasive, economic and easy to use in clinical practice, especially in primary care setting.

PP.21.42 VISIT-TO-VISIT VARIABILITY IN SYSTOLIC BLOOD PRESSURE AMONG PATIENTS WITH HYPERTENSION IN A PRIMARY CARE SETTING: A 10-YEAR RETROSPECTIVE COHORT STUDY

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Objective: Blood pressure variability (BPV) is associated with cardiovascular mortality and morbidity. BPV could be within a day, day to day and even visit to visit. Visit to visit BPV is a measure of long term variability. Some factors associated with long term BPV are older age, female gender, poor adherence and certain of antihypertensive drugs. We examined the visit to visit BPV and factors associated with it in a primary care setting.

Design and method: This is a retrospective study of a cohort over a period of 10 years. The BP of three visits: i.e. at baseline, 5 years and at 10 years were captured from patient records. Demographic factors, cardiovascular parameters and use of antihypertensive agents were also captured. We used standard deviation (SD) and coefficient as a measure of BPV. SD is calculated as √ [sum(individual blood pressure readings-sample mean blood pressure)2] number of visit and coefficient of variation as SD divided by the mean SBP.

Results: 1547 subjects were in original cohort, 91% (n=1408) had complete BP readings for analysis. The mean age of the participants at baseline was 56.4±9.8 years (ranged 30 -86). 33.8%% were males. The median of the standard deviation of systolic BP was 9.4(IQR=9.4) mmHg and coefficient of variation was 7.1(IQR6.3) mmHg. There is a significant relationship found between BPV and age, use of CCB, RAS inhibitors and beta-blockers. Every one year increased in age, the BPV is expected to increase by 0.013 mmHg.
The use of CCB, RAS inhibitors and beta-blockers are expected to decrease BPV by 0.308mmHg, 0.404mmHg and 0.303mmHg respectively.

Conclusions: There is a positive relationship found between BPV and age. Use of CCB, RAS inhibitors and beta-blockers was associated with lower BPV.

PP.21.43 IMPACT OF GENDER ON THE ASSOCIATION OF EPICARDIAL FAT THICKNESS AND CIRCADIAN BLOOD PRESSURE VARIABILITY IN PATIENTS WITH ESSENTIAL HYPERTENSION

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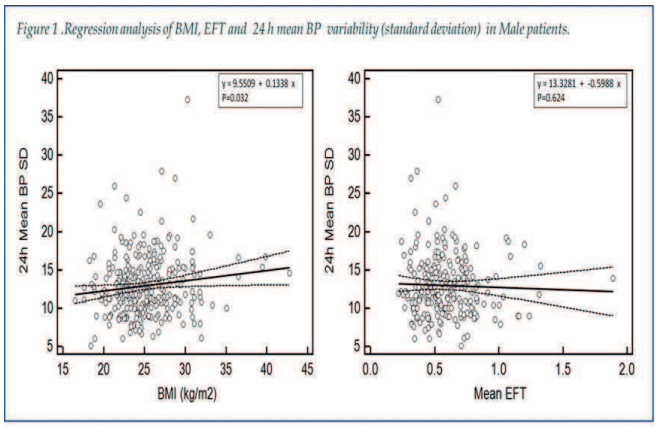
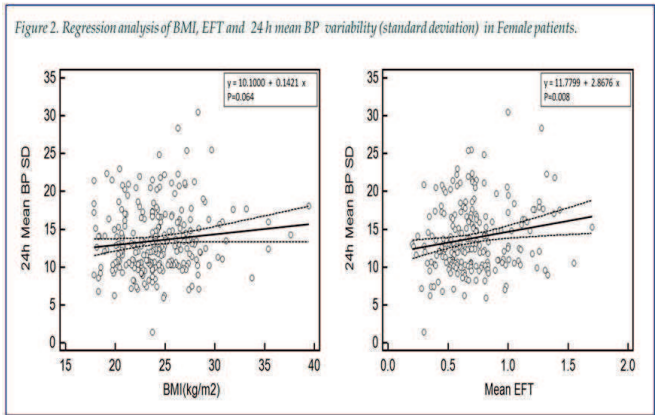
Objective: Epicardial fat thickness (EFT), an indicator of visceral obesity is an emerging cardiometabolic risk factor, and patients with obesity have an increased prevalence of the non-dipper blood pressure (BP) pattern. This study aimed to investigate the effects of gender on the association between EFT and circadian BP changes in patients with recently diagnosed essential hypertension (EH).

Design and method: A total of 441 patients with EH (Male/female: 236/205 and mean age: 50.7±13.8) and 83 control patients (normotensive normal weight, female/male: 41/42) underwent office BP measurements, 24-h ambulatory BP monitoring, laboratory measurements for cardiovascular risk factors and echocardiography. True EH was defined with ambulatory diagnosis, and obesity was defined when the body mass index was more than 25 kg/m2. EFT was averaged from the parasternal long axis and parasternal short axis echocardiographic images.

Results: Obese EH patients showed increased circadian BP profile with BP variability, increased wall thickness and LV mass compared to the non-obese EH and controls (all p's<0.05) without gender difference. Interestingly, EFT was thicker in female than male patients (7.0±2.5 vs. 5.9±2.2 mm, p<0.001), and highest in the obese female EH group (7.5±2.6 mm) than in the control (6.4±2.8 mm) and non-obese EH group (6.7±2.8 mm) among women, whereas EFT was not changed among the males (5.9±1.9 vs. 6.0±2.7 vs. 5.9±2.4 mm, p=0.937). Multivariate logistic regression analysis demonstrated that the 24 mean BP variability was associated with EFT (standardized beta coefficient = 0.16, p =016) and BMI (standardized beta coefficient=0.19, p =006) in female patients, but not in male.





Conclusions: The relationship of circadian BP variability, obesity and EFT was affected by gender in different manners. EFT may be a valuable parameter in the evaluation of BP severity and obesity in women than in men.

PP.21.44 OBESITY INFLUENCE ON CIRCADIAN VARIATIONS OF AMBULATORY BLOOD PRESSURE AND NOCTURNAL HEART RATE

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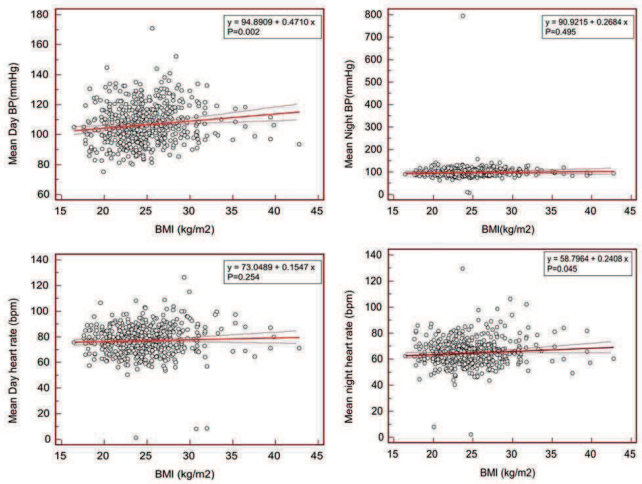
Objective: Obesity is characterized by hemodynamic and metabolic alterations. We investigated whether mean heart rate (HR) and blood pressure (BP) parameters during 24-h ambulatory BP monitoring (ABPM) are independent or additive markers of left ventricular (LV) hypertrophy in obese subjects with newly diagnosed, untreated essential hypertension.



Design and method: A total of 549 consecutive patients were analyzed. All patients underwent office BP measurements, 24-h ambulatory BP monitoring, laboratory measurements for cardiovascular risk factors and echocardiography. True EH was considered if the average daytime BP was higher than 135/85 mm Hg and the average nighttime BP was above 120/75 mm Hg, and obesity was defined when the body mass index was more than 25 kg/m2.

Results: Circadian BP profile with daytime BP variability and increased nighttime HR were significantly related to BMI (all p's < 0.001). Increasing nighttime HR or increasing ABPM parameters (day, night, 24 hour mean BP) were associated with increasing LV mass or relative wall thickness (all p's < 0.001). In multivariate analysis, after adjusting for age, gender, body mass index, hemoglobin, glucose, cholesterol, smoking, and each of the measured ABP parameters separately, nocturnal HR(p=0.002) was independently related to increasing LV mass in addition to 24-h mean BP(p<0.001)and BMI (p=0.001).

Conclusions: Obese hypertensive patients showed increased in BP variability during 24-h in comparison with nonobese patients; it also includes higher nocturnal heart rate, which are independent and additive markers of increased LV mass in untreated hypertensive individuals.

PP.21.45 MASKED HYPERTENSION IN OBESE DIABETIC PATIENTS COMPARED WITH NOT OBESE

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Objective: Masked hypertension (MHTA), is difficult to diagnose , and it is estimated that approximately 10% of the hypertensive population may have it. Currently studies with 24 h ambulatory blood pressure monitoring made easier to diagnose MHTA. However, there are some groups of patients (P) with high risk who do not have enough data on the prevalence of MHTA, such as diabetics and obese hypertensives. It seems therefore important to know the prevalence of MHTA in this group of patients.
To study the prevalence of MHTA in obese and non-obese diabetic patients.

Design and method: We studied 156 diabetic hypertensive P who were divided into two groups: group I: 106 P with body mass index (BMI) less than 30 and group II: 50 P with BMI equal to or greater than 30. In all of them, we previously check blood pressures in the office if they were within the permitted range (<135/80), adjusting the treatment if necessary and once the goal is achieved, underwent to a 24 hours ambulatory monitoring blood pressure, to assess the presence of MHTA, 24 hours microalbuminuria (Mcalb) and left ventricular mass index measured by ecocardioagrama (LVMI).

Results: The results of both groups were compared in the table shown below:

DATE	MHTA %	Mcalb/24 hs	LVMI
GROUP I	6 P (5.7%)	41±9	136±7
GROUP II	7 P (14%)*	56±1*	148±9*

*Means p value less than 0.05.

Conclusions: According to our data, the hypertensive diabetic obese patients have a higher prevalence of MHTA, being also significantly elevated Mcalb / 24 hs and hypertrophy of the left ventricle, thereby increasing the cardiovascular risk already exhibiting high. We consider that it is therefore mandatory, studies with AMBP in these patients to properly adjust treatment.

PP.21.46 EFFECT OF THE BISOPROLOL ON CENTRAL AORTIC PRESSURE, PULSE WAVE VELOCITY, AUTONOMIC NERVOUS SYSTEM IN LOCOMOTIVE WORKERS WITH HYPERTENSION

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Objective: Assess the impact of bisoprolol on central aortic pressure (CAP), pulse wave velocity (PWV), autonomic nervous system (ANS) in locomotive crews with hypertension.

Design and method: We examined 23 workers of locomotive crews with hypertension grade I, 32,7 + 7,3 years old median age. Blood pressure monitoring (Bpm) was conducted in the outpatient unit BPLab (Peter Telegin, Russia). When interpreting the research results, average systolic, diastolic, mean hemodynamic blood pressure and pulse for a day were analyzed. Structural and functional properties of the vascular wall were evaluated on the basis of ambulatory blood pressure device BPLab with additional software Vasotens. ANS was evaluated by means of tests Ewing unit Poly-Spectrum (Neurosoft, Russia). As the antihypertensive therapy applied bisoprolol 5 mg. Efficacy of treatment was evaluated after 12 weeks. Data were processed using the software package Statistica 6.0 and Biostat.

Results: Bpm showed hypertension in 100% of the surveyed patients. After 12 weeks of treatment, blood pressure was reduced according to Bpm: systolic 123.1 + 8.3 mmHg (16,7%; p <0.05) and diastolic 71.9 + 7.4 mmHg (16,3%; p <0.05) of in the daytime; systolic 112.7 + 7.3 mmHg. (14,1%; p <0.05) and diastolic 69.8 + 6.6 mmHg. (11,3%; p < 0.05) at night. Decreased average daily CAP: systolic (18,1%; p <0.05), diastolic (10,4%; p <0.05). PWV decreased by 5.3% from baseline (the average PWV was 9,7 m/s). Significantly decreased heart rate (14,0%; p <0.05) from baseline (the average HR was 76/min). According to the results of tests Ewing revealed the predominance of the sympathetic nervous system (mean score 6.1). During treatment with bisoprolol showed normalization balance ANS (mean score on tests Ewing was 2.3, which is 62.3 % less from baseline).

Conclusions: Bisoprolol normalizes blood pressure and CAP, decreases heart rate and PWV, reduces the risk of diseases of the cardiovascular system in patients with hypertension. Bisoprolol normalizes balance the ANS in patients with hypertension.

PP.21.47 BLOOD PRESSURE VARIABILITY IN RELATION TO 24-HOUR URINARY SODIUM EXCRETION IN HIGH SALT INTAKE POLISH POPULATION

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Objective: Blood pressure variability (BPV) is a novel and promising marker of cardiovascular risk. Some studies suggested increased salt intake as the explanation for non-dipping phenomenon or increased short-term BPV. The aim of the study was to investigate the relation between salt intake and blood pressure variability in high salt intake population.

Design and method: The study group included 159 subjects recruited from the general population of Southern Poland. Ambulatory blood pressure (ABP) monitors (SpaceLabs 90207) were programmed to obtain measurements each 15 min. during the day (6.00-22.00) and each 30 min. nighttime. Based on the ABP data, we calculated for systolic and diastolic BP: 24h, daytime and nighttime standard deviation (SD), and 'sleep-through' and 'preawakening' morning surge, as the indexes of short-term BPV, as well as day-night BP difference as the index of long-term BPV. Sodium intake was assessed based on 24h urinary sodium excretion. Database management and statistical analysis were performed with SAS software (SAS Institute, Cary, NC), version 9.3.

Results: The study group included 75 men and 84 women, with 95 hypertensive individuals (59.8%), mean age = 47.8±14.8 yrs, mean sodium excretion = 158 ± 67 mmol/l.
While adjusting for age, sex, antihypertensive treatment, body mass index, and life style, we did not observe any linear relation between sodium intake and calculated indicators of BPV. We observed positive correlation between sodium intake and 24h ([beta±SE]: 0.027 ± 0.013, p = 0.033) and nighttime (0.032 ± 0.015, p = 0.029) systolic BP.

Conclusions: In our study group, we confirmed the association of sodium intake with blood pressure values over 24 hours and during nighttime. However, in our high salt intake population, sodium intake was not related to blood pressure variability.

PP.21.48 DETERMINANTS OF MORNING-EVENING HOME BLOOD PRESSURE DIFFERENCE IN TREATED HYPERTENSIVES

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Objective: To investigate the determinants of home blood pressure (BP) morning-evening difference (MEdiff) in treated hypertensive patients.

Design and method: Cross-sectional study that included hypertensive outpatients aged >=18 years, receiving stable medication for at least 4 weeks, from the Hospital Italiano de Buenos Aires, Argentina. Enrolment was from April 2008 to April 2010. We used the Hospital`s database to obtain information on each participant's medical history, intake of medications, and smoking habits. Home blood pressure procedure was in compliance with ESH guidelines and used a validated OMRON HEM 705-CP. MEdiff was calculated as morning minus evening home BP. In statistical analysis with SPSS software (SPSS Inc., Chicago, IL), the relationship between MEdiff and the significant (P<0.05) clinical features identified by univariable analyses were tested using multivariable linear regression. The results are expressed as regression coefficients and 95% confidence intervals.

Results: 367 subjects were included in the final analysis, mean age 66.2 (14.5), BMI 28.1(4.5), total cholesterol 4.89 (1.0) mmol/L, 65.9% women, 11.7% smokers, 10.6% diabetics. Mean MEdiff was 1.1 (12.5) mmHg systolic and 2.3 (6.1) mmHg diastolic, respectively. Mean self-recorded BP was 131.5 (14.1) mmHg systolic and 73.8 (7.6) mmHg diastolic, respectively. In multivariable analyses, we found significant beta-coefficient values in systolic MEdiff for age and smoking, and in diastolic MEdiff for age, smoking, total cholesterol and calcium-channel blockers (Table).

Multivariable linear regression model for morning-evening blood pressure difference

Variable	Beta-coefficient (95% CI)	p value
Systolic morning-evening home BP difference		
Age	0.12 (0.03-0.21)	0.007
Smoking habit	-7.52 (-11.44-[-3.61])	<0.0001
Diastolic morning-evening home BP difference		
Age	0.07 (0.03-0.12)	0.001
Total cholesterol	0.99 (0.38-1.6)	0.002
CCB use	1.44 (0.21-2.66)	0.02
Smoking habit	-2.91 (-4.81-[-1.02])	0.003

Conclusions: Older age, smoking, total cholesterol and use of calcium antagonists were independent determinants of MEdiff in treated hypertensive patients. Elevated MEdiff has been associated with higher cardiovascular risk, and might provide further information for risk stratification purposes.

PP.21.49 24 HOURS CHRONOMICS OF AMBULATORY BLOOD PRESSURE AND ITS RELATION WITH CIRCADIAN RHYTHM OF 6- SULFATOXY MELATONIN IN ROTATING NIGHT SHIFT HEALTH CARE WORKERS

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Objective: Night shift work is associated with a disruption of circadian rhythms, where a person's internal body clock is in conflict with the rotating shift schedule. The circadian rhythm of the human body is characterized with an alternating sleep-wake cycle. Shift work has been associated with increased risk of hypertension, cardiovascular diseases and hormonal disturbances. The Present study was aimed to investigate the effects of rotating night shift on 24 hours Chronomics of BP/HR and its relation with 6-Sulfatoxy Melatonin levels.

Design and method: 62 healthy nursing professionals, aged 20-40 year, performing day and night shift duties were recruited. Each study subject had a monthly scheduled of regular 9 night shifts (12 hours night shift, from 20:00 to 08:00) followed by remaining 17-18 day shifts (6 hours day shift, from 08:00 to 14:00) with a total of 4 days off in between. Subjects were recruited from the Trauma Center, GM and Associated Hospitals, King George's Medical University, Lucknow, UP, India. The duration and pattern of shift work were the same among all the subjects. Ambulatory BP and HR were recorded at every 30 min intervals in day time and each hour in night time synchronically with circadian pattern of 6 sulfatoxy melatonin during shift duties. 6-sulfatoxy melatonin (melatonin sulphate) was estimated by Competitive ELISA method (IBL international melatonin sulphate ELISA kit).

Results: Highly Significant difference was found in double amplitude (2DA) of blood pressure between night and day shift (p<0.001). Ecphasia (odd timing of circadian pattern of blood pressure not of heart rate) was also found in few subjects. In night shift, hyperbaric index (HBI) of mean systolic blood pressure was found to be increased at 00-03 am (midnight) while during day shift, peak was found at 06-09 am. Peak melatonin was to be found in early morning as compared to mid night in both the shifts.

Conclusions: The present study concluded that the desynchronization was appeared during night shift and entrainment of circadian rhythm in the day shift.

PP.21.50 BLOOD PRESSURE VARIABILITY AND RESISTANT HYPERTENSION IN A VERY ELDERLY POPULATION

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Objective: Resistant hypertension is defined as the absence of blood pressure (BP) control in subjects treated with at least 3 anti-hypertensive drugs including a diuretic. Blood pressure variability (BPV) proved to be directly related to organ target damage independently from blood pressure control.
In a very elderly population undergoing ambulatory blood pressure monitoring (ABPM) we evaluated BPV differences in relation to blood pressure control and diagnosis of resistant hypertension.

Design and method: 701 elderly subjects (aged over 75 years) in anti-hypertensive pharmacological treatment underwent ABPM at our Institution between January 2001 and November 2013. All the recordings were performed using the same oscillometric device (TM 2430), in order to avoid confounding factors; all ABPMs fulfilled both the following criteria: > 23 hours recording and at least 2 valid measurements/hour (>70 % of total measures). All the usual ABPM parameters were recorded: mean 24h systolic (MSP) and diastolic (MDP) pressures, pulse pressure (PP), blood pressure variability (BPV), dipping status and heart rate, clinical BP measurements, age, sex, body mass index, smoking habits, diabetes. Moreover dipper and non-dipper status (difference day- night > 10mmHg) was also calculated for all the pressures.

Results: 43 % of our elderly subjects received a therapy that was conceivable with a RH diagnosis, among those 35 % showed uncontrolled BP values.
Among the remaining 56 % of subjects treated with less than 3 anti-hypertensive drugs 51% showed uncontrolled BP values.
BPV whatever expressed proved to be significantly higher in elderly uncontrolled subjects with RH, whether controlled or uncontrolled.

Conclusions: In our elderly patients the number of anti-hypertensive drugs proved to be better related to blood pressure control. Missing of target blood pressure control seems related to increased BP variability both in RH and not RH subjects. Even if the study population cannot be regarded as a global hypertensive picture, we confirm the extreme difficulty in BP control in very elderly subjects.

PP.21.51 TYPICAL BLOOD PRESSURE RESPONSE TO DOBUTAMINE STRESS ECHOCARDIOGRAPHY IN PATIENTS WITHOUT KNOWN CARDIOVASCULAR DISEASE

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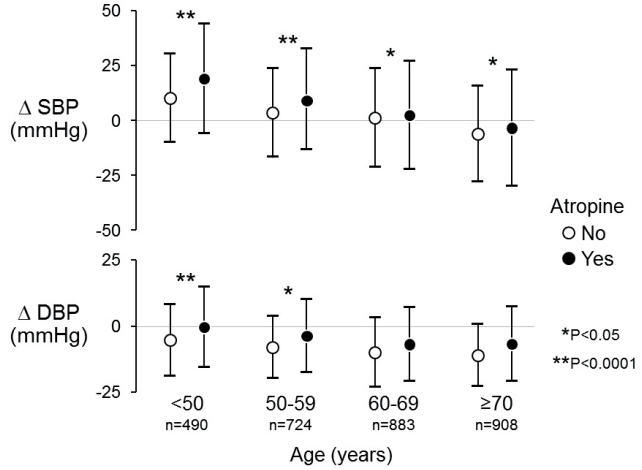
Objective: Although dobutamine stress echocardiography (DSE) is widely performed, blood pressure (BP) response has not been thoroughly studied. We sought to define typical BP response to dobutamine in patients (pts) not known to have cardiovascular disease.

Design and method: We evaluated 23208 pts who underwent DSE at Mayo Clinic, Rochester MN, from November 2003 to December 2012. We excluded pts with a history of hypertension, diabetes, or coronary artery disease, and pts taking beta-blockers, calcium-blockers, or inhibitors of the renin angiotensin aldosterone system. Pts who had abnormal DSE were also excluded (wall motion abnormalities).

Results: 3005 patients were eligible for the study. During DSE, systolic BP (SBP) increased slightly from rest to peak stress (delta +2.9 ±24 mmHg, p <0.0001) and diastolic BP (DBP) decreased (delta -7.4 ±14 mmHg). BP changes were age-related (Figure). The deltaSBP of pts who received atropine (n= 1284, 43%) was greater than that of pts who did not (+7.4 ±26 vs. -0.5 ±22 mmHg, P <0.0001) and deltaDBP was less (-4 ±4 vs. -9.7 ±12 mmHg, p <0.0001). This effect of atropine was present in men (deltaSBP and deltaDBP +8.4 ±26 and -4.4 ±15 with atropine vs. +1.6 ±34 and -9 ±12 without atropine) and women (+6.4 ±25 and -4.3 ±14 vs. -1.9 ±21 and -10 ±12), and more pronounced in younger pts (Figure).



Conclusions: The typical BP response to DSE is a slight increase in SBP and a decrease in DBP. The deltaSBP is greatest in younger pts. Overall BP responses are higher with atropine, regardless of gender, and most evident in younger pts.

PP.21.52 BLOOD PRESSURE VARIABILITY IN PATIENTS WITH UNCONTROLLED OFFICE BLOOD PRESSURE: FIRST GET (THE) MEAN?

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Objective: Blood pressure variability (BPV) has been associated with increased cardiovascular risk. This study aimed to determine the BPV of primary care patients with uncontrolled office blood pressure (BP) using home blood pressure (HBP) readings.

Design and method: A cross-sectional study was conducted in primary care patients with uncontrolled office BP, defined as systolic BP of > 140mmHg and/or diastolic BP of >90 mmHg. Participants were loaned HBP monitors to take home for a month. Patients were given oral and written instructions to perform HBP measurements daily, two upon waking and two in the evening. We defined BPV as the standard deviation (SD) of HBP measurements. Patients' demographic data were recorded and are reported as mean (+SD) for continuous variables and frequency (+percentage) for categorical variables. Spearman's correlation coefficient was used to determine correlation. All analyses were performed using SPSS software (version 21).

Results: Twenty patients were recruited; mean age= 59 (SD 11.2), age range 40-79 years. The majority was male (n=11, 55%). The mean office systolic and diastolic BP upon enrollment were 151 mmHg and 85 mmHg, but mean systolic and diastolic HBP were lower at 129.4 mm Hg and 74.9 mm Hg. The calculated SD to reflect the BPV was 10.1 mm Hg for systolic HBP and 7.0 mm Hg for diastolic HBP. There was a weak but significant correlation between mean systolic HBP and SD (r=0.68, P=0.001). However, this was not observed for diastolic HBP (r=0.41, P=0.07). Four from twelve patients (33%) with controlled mean systolic HBP (systolic HBP < 135 mmHg) had high BPV (SD>9.43). However,five from six patients (83%) with a high mean systolic HBP (systolic HBP > 135 mmHg) had high BPV.

Conclusions: HBP monitoring allows measurement of blood pressure variability. In this study, 83% participants with uncontrolled mean systolic HBP had high BPV whereas only 33% of those with controlled mean systolic HBP had high variability. This possibly indicates that measurement of BPV may be more useful in those with controlled mean systolic HBP and the initial focus of treatment should be to get the mean HBP to target.

POSTERS' SESSION

POSTERS' SESSION PS22
CORONARY HEART DISEASE

PP.22.01 STUDY OF FREQUENCY OF ACUTE CORONARY SYNDROMES IN PATIENTS PRESENTING WITH CHEST PAIN IN A PRIMARY HEALTH CARE CENTER (PHCC)

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Objective: Ischemic myocardial disease is the most common cardiovascular disease, associated with high morbidity and mortality worldwide. The aim was to study and distinguish acute heart episodes from cases of chest pain, due to other causes, in patients attending a PHCC located in Salamis Island, Greece.

Design and method: Among all cases (1380) of chest pain examined during September – December 2013, 220 (15.94%) patients had suspicious symptoms and were referred to further examination and 165 (11.96%) patients appeared with an acute coronary syndrome (ACS). Most participants were aged 61-70 (31.43%).

Results: Among the participants, 28.6% had a verified positive family history of coronary artery disease. Some of them (22%) did not comply with their medication regimen and a previous heart episode was mentioned by 15.7%. Only 14.3% had been examined with coronary angiography. Percutaneous Coronary Intervention has been performed to 11.42% and 1.42% had undergone coronary-artery bypass. Risk factors were; hypertension (52.85%), smoking (37.15%), dyslipidemia (27.14%), anxiety disorder (4.28%) and genetics (1.42%). Most of the patients (62.85%) had a typical clinical syndrome while the others appeared without typical clinical manifestations. Electrocardiographic findings consistent with STEMI were found in 32.02% of patients. All patients were treated in respect to the national clinical guidelines and 3 patients (3.3%) had undergone thrombolysis, due to delay for transportation to the hospital. A new Left Bundle Branch Block was apparent in 5.71% of patients. Episodes of unstable angina with ischemic repolarization disorders were recorded in 29.42%. All patients after evaluation and initial treatment were transported to a hospital (57.14%). One patient (1,42%) died.

Conclusions: There is a great incidence of acute coronary events in a Greek PHCC. General practitioners, following international guidelines deal with them successfully, despite lacking resources. Initial evaluation and treatment of ACS in a PHCC is of vital importance and contributes to lower morbidity and mortality rates. In regard to prevention, PHCC aims to early diagnose patients with high risk factors for cardiovascular disease.

PP.22.02 ENDOTHELIAL DYSFUNCTION AND SYSTEM INFLAMMATORY RESPONSE MARKERS IN HYPERTENSIVE PATIENTS WITH ACUTE MYOCARDIAL INFARCTION DEPENDING ON POLYMORPHISM OF ACE (I/D) AND ENOS (894G>T)

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Objective: The aim of the study is to find the dynamics of endothelial dysfunction (ED) humoral factors and systemic inflammatory response (C-reactive protein, CRP) in hypertensive patients with myocardial infarction (MI) under the influence of individualized treatment based on the angiotensin-converting enzyme (ACE) and eNOS genes polymorphisms.

Design and method: 15 women (14.7%) and 87 men (85.3%), mean age 60.7±4.25 (22 to 83) participated in the study. Control group consisted of 30 healthy subjects with a corresponding gender and age distribution. Essential hypertension and MI, as well as inclusion and exclusion criteria were based on ESH and ESC Guidelines. Total stable NO metabolites (NO^{2-}+NO^{3-}) and sVCAM-1 were determined by calorimetric method, CRP – by ELISA. eNOS gene allele discrimination was performed using Ban II (Eco241) restriction endonuclease.

Results: Levels of sVCAM-1, NO metabolites and CRP before treatment were 28.9%, 18.6% and 47.1%, respectively higher ($p<0.05$) in Q-MI patients than in non-Q-MI patients. NO metabolites growth 4.43-4.80 times increased the risk of MI regardless of its type, location and sequence ($p<0.001$). Raised CRP 2.16 times increased risk of Q-MI (OR=3.75), left ventricular front wall myocardium – 2.77 times (OR=7.79), the primary occurrence – 2.08 times (OR=3.44). Content of NO metabolites decreased more after treatment with thrombolytic therapy in carriers of D-allele of ACE gene (39.1% and 35.2%) and did not depend on the allele status of eNOS gene.

Variable	Before treatment, n=88	27-28 days of treatment, n=44		6 months, n=44
		after TLT, n=24	w/out TLT, n=20	
sVCAM-1, ng/ml	1258.6±97.0	801.0±61.3 $p<0.001$	844.9±83.2 $p<0.001$	850.3±102.4 $p<0.01$
$NO/NO_2^-/NO_3^-$, mkmol/l	45.7±4.01	28.8±2.02 $p<0.001$	34.8±2.76 $p<0.01$ $p_1<0.05$	27.5±4.22 $p<0.001$ $p_2<0.05$
CRP, mg/l	10.3±1.02	4.15±0.97 $p<0.001$	4.74±1.01 $p<0.001$	5.08±1.42 $p<0.001$

Conclusions: The presence of DD-genotype of ACE gene is associated with a significantly greater decrease of sVCAM-1 and CRP levels under influence of treatment (better with thrombolytic therapy (TLT), $p<0.05$); in T-allele carriers of eNOS gene the level of sVCAM-1 under TLT decreased by 30,7-31,2%. NO metabolites decreased stronger in D-allele carriers of ACE gene, also after combined treatment with TLT (39.1% and 35.2%) and did not depend on the allele state of eNOS gene.

PP.22.03 THE CLINICAL OUTCOME OF TARGET NON-HIGH DENSITY LIPOPROTEIN-CHOLESTEROL (NON-HDL-C) ACHIEVEMENT IN PATIENTS WITH ACUTE MYOCARDIAL INFARCTION: A PROPENSITY SCORE MATCHED ANALYSIS

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Objective: Little data is available on the clinical outcome differences of acute myocardial infarction (AMI) patients undergoing percutaneous coronary intervention (PCI) that have or have not achieved target non HDL-C levels. The authors investigated whether target non HDL-C level (below 100 mg/dL) achievement in patients with AMI is associated with a better clinical outcome.

Design and method: This large-scale, prospective, multicenter study involved 13,473 AMI patients registered in the Korean Acute Myocardial Infarction Registry (KorMI) between May 2008 and Sep 2012. 12,720 patients survived and 6,746 patients completed 1-year of clinical follow up. Of these 6,746, 3,315 patients received serial lipid profile follow up. Propensity score matching was applied to adjust for differences in baseline clinical and angiographic characteristics, and finally, 1,272 patients (636 target non HDL-C achievers and 636 non-achievers) were included in the present study. The primary end point was a composite of 1-year major adverse cardiac events (MACEs), such as, cardiac death, recurrent myocardial infarction (MI), target lesion revascularization (TLR), and coronary artery bypass grafting (CABG).

Results: After propensity score matching, baseline clinical and angiographic characteristics were similar in the achiever and non-achiever groups. Clinical outcomes of the propensity score matched patients showed no significant differences in cardiac death (4 (0.6%) vs. 2 (0.3%), P=NS), recurrent MI (4 (0.6%) vs. 9 (1.4%), P=NS), TLR (29 (4.6%) vs. 26 (4.1%), P=NS), MACEs (34 (5.3%) vs. 39 (6.1%), P=NS), or stent thrombosis (8 (1.3%) vs. 10 (1.6%), P=NS).

Conclusions: In this propensity-matched comparison, target non-HDL-C achievement in AMI patients undergoing PCI did not show the better clinical outcomes.

PP.22.04 DATA MINING GENERATED INSIGHT INTO THE EFFECT OF BLOOD PRESSURE ON IN-HOSPITAL OUTCOME FOR ACUTE CORONARY SYNDROME PATIENTS

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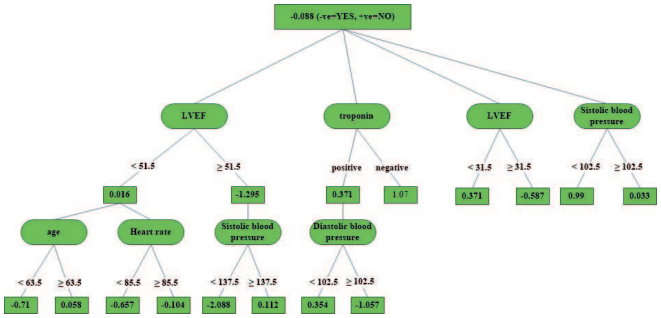
Objective: To develop an in-hospital outcome prediction model for acute coronary syndrome (ACS) patients after coronary angioplasty (CA) and evaluate the importance of different indicators, using data mining.

Design and method: A total of 2030 patients (aged 61.29 +/- 11.70 years, 66.79% males), hospitalized for ACS and treated with CA from December 2008 to December 2011 were assigned to a derivation cohort. The initial set of features, which included demographic and anamnestic data (age, gender, history of hypertension, diabetes, hyperlipidemia requiring treatment, family history of myocardial infarction, smoking habits, alcohol consumption), clinical characteristics at admission (systolic and diastolic blood pressure, and heart rate), biochemical analysis of blood parameters at admission (hemoglobin, troponin, urea, creatinine), and Left Ventricular Ejection Fraction (LVEF) formed the basis of the study. A number of machine learning algorithms available within Waikato Environment for Knowledge Discovery -WEKA have been evaluated and the most successful was chosen. Cost sensitive classification was explored as an additional methodology to enhance results. Ten-fold cross validation was used for model validation. The predictive model was subsequently validated in a different population of 931 patients (validation cohort), hospitalized during 2012.

Results: In-hospital mortality in the derivation cohort was 7.73%, and 6.64% in the validation cohort. The best prediction results were achieved using Alternating Decision Tree (ADTree) classifier, which was able to predict in-hospital mortality with 89% accuracy (AUROC=0.91), and preserved good performance on validation cohort 87% accuracy (AUROC=0.82). ADTree (displayed on the figure below) identified a subset of six attributes most relevant to mortality prediction: systolic and diastolic blood pressure, heart rate, LVEF, age, and troponin.



Conclusions: The predictive model developed in this study is a new tool integrating demographic, clinical, laboratory and echocardiographic variables intended for patients with ACS after CA. The ADTree data mining technique, independently selected six patient features that have most bearing on the problem, showing that systolic and diastolic blood pressure are key indicators. In addition, incorporation of the model developed in the study into contemporary practice should facilitate research, clinical decisions and optimization of treatment strategy in selected high risk patients.

PP.22.05 IMPACT OF HYPERTENSION ON OUTCOME IN PATIENTS ADMITTED FOR ACUTE CORONARY SYNDROME

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Objective: There are scarce data available on the impact of hypertension on outcome in patients presenting with acute coronary syndrome (ACS) from "real-life" clinical settings involving great numbers of patients.

Design and method: Data were used from the Swiss national registry AMIS Plus (Acute Myocardial Infarction in Switzerland), which prospectively collects data on patients with ACS. All ACS patients enrolled from 1997 to 2013 were included and patients with a history of hypertension were compared with those without. Hypertension was defined if diagnosed and/or treated by a physician. Main outcome measurements were in-hospital and 1-year follow-up survival. The data were analyzed using multiple logistic regressions.

Results: From the 43,912 patients enrolled for ACS, 41,771 (95.1%) were included. Of these, 24,916 (59.6%) had a history of hypertension. In comparison with those patients without hypertension, hypertensive patients were predominantly female (31% vs 21%; p<0.001), older (69.3y vs. 61.6y; p<0.001), had worse cardiac functions (Killip class>2 7.8% vs. 5.3%; p<0.001) more comorbidities (Charlson Comorbidity Index>=2 31.6% vs 12.4%; p<0.001), more frequently diabetes (26.8% vs 10.8%; p<0.001), dyslipidemia (64.2% vs 46.1%; p<0.001) and obesity (BMI>30 24.7% vs 13.8%; p<0.001). Patients with hypertension presented 35min later (p<0.001) and less frequently with ST-elevation myocardial infarction (51.7% vs 62.7%). Less patients with hypertension were alive at the end of hospitalization (93.4% vs 95.5%, p<0.001), but after adjusting for all covariates, a history of hypertension was an independent predictor of in-hospital survival (OR 1.22, 95%CI 1.08 to 1.38; p=0.002). In subgroup analyses of 7801 ACS patients followed for 1 year, hypertension was no longer an independent predictor of survival (OR 0.91, 95%CI 0.66 to 1.25; p=0.56).

Conclusions: Patients admitted for ACS with a history of hypertension were older, sicker, with worse risk profiles and cardiac functions, but they had better adjusted hospital survival rates. However, this effect was not lasting. Therefore, further studies are needed to evaluate the impact of existing hypertension on the survival of ACS patients.

PP.22.06 ISCHEMIC HEART DISEASE AND ARTERIAL HYPERTENSION COURSE IN PATIENTS TREATED IN SPECIALIZED HYPERTENSIVE UNIT

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Objective: In some trials and substudies there were evaluated the disease course on different drugs in patients with arterial hypertension and ischemic heart disease (IHD). But in very fewer ones there were compared the complication rates in hypertensive patients with and without IHD.

Design and method: 524 patients (mean age-53.4+/-0.73 yr, mean SBP/DBP-177.8+/- 1.5/104.7+/-0.8 mmHg), who were treated in special hypertensive unit, were included in retrospective 5-year follow-up analysis: 1st gr. – 184 patients with verified IHD; 2nd gr. – 340 patients without signs of IHD. The treatment was administered according to physician prescriptions. Kaplan-Meier survival curves and Cox regression analysis were used for calculation of event rates and odds ratio (OR) with confidence interval (CI) 95%. The primary end-point was any cardiovascular event, the secondary end-points - coronary events, stroke, death.

Results: Patients with IHD were older, with more males, with more frequent history of stroke, renal diseases and diabetes mellitus, more left ventricular mass index and systolic dysfunction, than patients without IHD. Primary end-point rate was more in patients with IHD (OR=1.68, CI 1.21-2.34). Myocardial infarction, unstable angina, death were more frequently in the 1st gr. too: OR=3.9, CI 1.58-9.7; OR=2.5, CI 1.26-4.9; OR=3.65, CI 1.95-6.8. No any significant differences were found in stroke (7.1vs5.6%), heart failure (4.9vs2.1%) and renal failure (1.6vs0.9%) rates. In 2nd gr.46.7% died from stroke, 13.3% - from renal failure, 13.3% – from cancer, 13.3% -from coronary events and in 20.0% we could not find any data about death reason. In the 1st gr. 41.4% died from coronary events, 13.8% - from stroke, 10,3% - from renal failure, 10.3 % – from cancer and in 24.1% the reason was unknown. Patients with and without IHD had different factors that increased the risk of end-point development. SBP level was connected with stroke rate, but not with coronary event rate.

Conclusions: Concomitant IHD significant increased the rate of coronary events and death, but not stroke in patients with arterial hypertension. Hypertensive patients with IHD had different death structure and risk factors, than patients without IHD.

PP.22.07 A NEW FRAMEWORK FOR TREATMENT OF PATIENTS WITH HYPERTENSION AND CORONARY ARTERY DISEASE. INTEGRATING LEFT VENTRICULAR MASS INTO TARGET DIASTOLIC BLOOD PRESSURE

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Objective: Optimal diastolic blood pressure (DBP) for patients with hypertension (HTN) and coronary artery disease (CAD) is an ongoing challenge because DBP is a major determinant of coronary blood flow.

Design and method: Blood pressure in coronary arteries proximal and distal to coronary artery stenosis was measured at coronary angiography. Factional flow reserve (FFR) across stenotic CAD was measured during maximal hyperemia, achieved by adenosine. DBP distal to coronary stenosis is coronary perfusion pressure. All persons had transthoracic echocardiography and LV mass calculated by ASE criteria.

Results: LV mass was significantly ($p<0.001$) higher in patients with HTN 171±46 g or 90±20 g/m2 (N=52) compared to respectively 121±30 g or 68±15 g/m2 in patients without HTN (N=19). LV ejection fraction was the same in both groups 59±9% vs. 61±8%. At systemic DBP of 90, 80, 70 and 60 mmHg, coronary perfusion pressure was respectively 70±7, 63±6, 55±6 and 47±5 mmHg. In HTN, LV mass varied from 85 to 328 g or 59 to 153 g /m2, which would, translates into a 4 fold difference in coronary blood flow per g LV mass. Patients in the highest tertile of LVmass had a coronary perfusion pressure /LVmass index at DBP of 90, 80 and 60 mmHg of 31±6, 28±5, 21±4 mmHg/g LV mass. This was significantly lower than those in the lowest tertile of LV mass who had a coronary perfusion pressure /LVmass index at DBP of 90, 80 and 60 mmHg of 60±10, 53±9 40±7 mmHg LV mass.

Conclusions: Patients with HTN and CAD have a wide range of LV mass and those in the highest tertile of LV mass are at greater risk of compromised coronary blood flow with significant reductions in coronary perfusion pressure at lower systemic DBP. With the caveat of the multitude of factors that regulate coronary artery blood flow and myocardial oxygen requirements, these data suggest that guidelines for treatment of patients with HTN and CAD should consider LV mass and recommend higher (and not lower) DBP targets for patients with higher LV mass and especially those with left ventricular hypertrophy.

PP.22.08 OBSERVATIONAL STUDY OF CARDIAC PATHOLOGY INCOME IN AN INTERNAL MEDICINE OF A GENERAL HOSPITAL

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Objective: Our aim was to analyze the characteristics of elderly patients admitted for heart failure in our service.

Design and method: A retrospective observational study from April 2012 to July 2012 patients over 75 years with a discharge diagnosis of heart failure in internal medicine from Almeria Torrecárdenas hospital. Clinical and epidemiological variables, predisposing risk factors and treatment instituted at discharge were analyzed. Data were analyzed using SSPS 19.0 statistical program.

Results: A sample of 65 patients with a mean age of 81 ± 5 years was obtained. 66% women and 34% men . The main risk factors found were: hypertension in 85% patients, ventricular hypertrophy in 45% patients and previous history of ischemic heart disease in 27% patients. 13% of the patients studied were receiving home oxygen therapy for chronic respiratory failure.
The diagnostic criteria were clinical heart failure: 100% of the patients studied during this period looked dyspnea: 80 % and 20% progressive dyspnea sudden dyspnea. Auscultation was abnormal in all of them, describing crackles in 93% .
During admission, echocardiography was performed in 13% patients, aiming 7 patients with ventricular systolic dysfunction and 4 patients with valvular disease. All 8 patients had ventricular hypertrophy.
Regarding drug treatment at discharge: 85% had ACE inhibitors / ARBs , 100% loop diuretics and only 65 % received B -blockers.

Conclusions: The problem of hospital readmission is common to all environments. All patients have been discharged after an episode of heart failure destabilization of their need to be reassessed in 7-10 days high post. This follow-up visit should include the following points:
- Ensure that the medication is taken properly.
- Assess the performance of salt-restricted diet.
- Assess changes in body weight.
- Adjust the dose of diuretics and other medications depending on the clinical situation and the analytical determination of creatinine, sodium and potassium.
- Check the capacity of the patient and their caregivers to recognize clinical deterioration at an early stage to consult with your doctor.

PP.22.09 STUDY OF THE EFFICACY OF COMBINED DRUG CONTAINING CLOPIDOGREL AND ACETYLSALYCILIC ACID IN PATIENTS WITH ARTERIAL HYPERTENSION ASSOCIATED WITH ACUTE CORONARY SYNDROME

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Objective: The aim is to study the efficacy of combined drug containing clopidogrel and acetylsalycilic acid in patients with arterial hypertension (AH) associated with acute coronary syndrome (ACS).

Design and method: 40 patients with AH associated with ACS were examined, 40% of them - with unstable angina (UA) class III, 30% - with non Q-wave myocardial infarction (MI), 30% - with Q-wave MI. At admission patients received standard antithrombotic therapy including antithrombin (enoxaparin 1 mg/kg body weight subcutaneous twice daily during 8 days) and dual antiplatelet therapy (in addition to aspirin, original clopidogrel was administered, both drugs in loading dose) and 1 day after admission - combined drug coplavix containing 100 mg of aspirin and 75 mg clopidogrel (manufactured by Sanofi Aventis). Primary angioplasty was performed in 40% of patients with Q-wave MI, thrombolytic therapy in 60% of patients. Platelet hemostasis was studied in all patients. Monitoring of platelet function in clinical use of antiplatelet agents was performed on platelet aggregation analyzer Helena AggRAM.

Results: Stent thrombosis was detected in none of the patients taking coplavix. Coplavix effectively reduced platelet aggregation induced by adenosine diphosphate: an average light transmittance was 25.0%, which was statistically significantly lower than baseline ($p<0.01$). Coplavix effectively reduced adrenaline-induced platelet aggregation: average light transmission was 25.7% and was also significantly lower than at baseline ($p<0.01$). Resistance was detected in none of the studied patients taking coplavix. Adverse drug reactions such as bleeding, thrombocytopenia, anemia, diarrhea, and others were not detected in any of the treated patients.

Conclusions: Fixed combination drug coplavix is an effective and safe drug that improves patients' adherence to treatment.

PP.22.10 PLASMA HEMOSTASIS IN PATIENTS WITH ARTERIAL HYPERTENSION ASSOCIATED WITH ACUTE CORONARY SYNDROME AND ANXIETY-DEPRESSIVE DISORDERS

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Objective: The aim was to study plasma hemostasis in patients with arterial hypertension (AH) associated with acute coronary syndrome (ACS) and anxiety-depressive disorders.

Design and method: 54 patients with AH associated with ACS and anxiety-depressive disorders were included in a pilot randomized prospective comparative study. Along with standard therapy of AH and ACS patients in group I (n = 27) were prescribed Agomelatine (Valdoxane produced by SERVIER), 25 mg per day, patients in group II (n = 20) - placebo. Mental status, plasma hemostasis were analyzed on admission, at discharge and at 6 months. Determination of parameters of plasma hemostasis was performed on coagulometer «ACLTOP» (USA) using a reagent kit («Instrumentation Laboratory» USA). The concentration of soluble fibrin monomer complex (SFMC) in plasma was determined using the ortho-phenanthroline test.

Results: Both treatment groups were compared by clinical and demographic characteristics. Depression level according to the Beck scale was 25.8±7 points in group I and 22.6±6.9 points in group II (depression of moderate severity) ($p=0.09$). After 6 months of treatment in Valdoxane group decrease of points sum according to the Beck scale from 25.8 to 22.8±6.5 ($p=0.001$) and from 60.3 to 51.7±21.1 ($p=0.0001$) according to Sheehan scale. In placebo group anxiety and depression level didn't change. After 6 months total fibrinogen (TF) in group I decreased from 4.9 g/l to 3.2 g/l ($p=0.00002$), in group II - from 5.6 g/l to 4,5 g/l ($p=0.016$), SFMC in group I decreased from 10 mg% to 3.5 mg% ($p=0.00002$), in group II SFMC didn't reach normal level (decreased from 9.0 mg% to 7.4 mg%). Intergroup comparison of SFMC and TF at 6 months revealed significant differences among the exponents (SFMC $p = 0.03$; TF $p = 0.016$).

Conclusions: Standard antithrombotic therapy of patients with AH associated with ACS and anxiety-depressive disorders leads to insufficient reduction of parameters of plasma hemostasis. Administration of Valdoxane improved the mental state of patients and led to normalization of plasma hemostasis.

PP.22.11 EFFECTS OF TOCOTRIENOL-RICH VITAMIN E SUPPLEMENTATION ON CENTRAL AORTIC SYSTOLIC PRESSURE AND AUGMENTATION INDEX IN ISCHAEMIC HEART DISEASE PATIENTS WITH DIABETIC VASCULOPATHY

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Objective: The effects of tocotrienol on cardiovascular health have been previously assessed and discussed. In this placebo controlled, double blind randomized control trial; we looked at the effects of a palm-oil based, tocotrienol-rich vitamin E preparation on central aortic systolic pressure (CASP) and radial augmentation index (AIx), which are now considered robust predictors of cardiovascular risk and clinical outcome, on ischaemic heart disease patients with established diabetic vasculopathy.

Design and method: A total of 39 ischaemic heart disease patients with established diabetic vasculopathy (mean age 53.62±6.17), and 46 non-diabetic ischaemic heart disease patients (mean age 51.33±4.95), serving as age and sex-matched controls, completed the study. Both groups were randomized to either receive the commercially available Tocovid SupraBio (Hovid, Ipoh, Malaysia) on a 200mg once daily dosing or placebo, for twelve weeks duration. CASP, AIx and brachial blood pressure values, obtained using BPro (Healthstats, Singapore), were recorded during the baseline visit, after six weeks, and again at the end of study. Patients that had been diagnosed with valvular heart disease, cardiomyopathy or non-obstructive coronary artery disease, had previous history of myocardial infarction or stroke, atrial fibrillation, autoimmune diseases, signs or symptoms of collagen disease or cancer, liver or kidney failure, uncontrolled hypertension, or if they were on corticosteroids, immunosuppressants or anti-inflammatory drugs (except low dose aspirin), were excluded.

Results: While there were reductions in CASP levels in both the diabetic (103.94±4.66 to 103.44±5.02, P=0.60) and non-diabetic (105.90±6.12 to 104.24±6.02, P=0.18) tocotrienol-treated groups, these differences were all statistically insignificant. Similarly there were no statistically significant differences between baseline and end-of study values for AIx in both the tocotrienol-treated groups. Following statistical adjustment of data for age, heart rate, height, weight, total cholesterol and glucose, the mean differences of all parameters of interest remained statistically insignificant.

Conclusions: Supplementation of tocotrienol-rich vitamin E in patients of ischaemic heart disease with established diabetic vasculopathy yielded no statistically significant improvement in CASP and AIx. However the trend of CASP improvement in this group of patients is promising and may warrant larger studies in the future.

PP.22.12 INFLUENCE ON AGGRESSIVE ATORVASTATIN THERAPY ON PARAMETERS OF ARTERIAL RIGIDITY AND QUALITY OF LIFE IN PATIENTS WITH PROVEN CORONARY ARTERY DISEASE

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Objective: To assess the impact of aggressive atorvastatin therapy on clinical efficacy and indicators of vascular stiffness in patients with proven coronary artery disease (CAD).

Design and method: 25 patients with CAD were examined: 22 men and 3 women aged 35 to 71 years (mean age 56,5 ± 9,0 years). The diagnosis was confirmed by coronary angiography: identification of more than 50% stenosis of one or more coronary arteries. All patients received atorvastatin in a fixed daily dosage of 80 mg for 24 weeks. To study the daily ambulatory arterial stiffness BP monitor BPLab (Peter TELEGIN, Russia) was used. Automatically calculated: mean daily values of central systolic, diastolic and pulse pressure, Aix Common - augmentation index in the aorta, Aixaore - augmentation index in the aorta, reduced to heart rate 75 beats per minute, aortic pulse wave velocity (PWVao). Ultrasonography of the carotid arteries was performed by device My Lab 90 (Esaote, Italy) with the definition of intima-media thickness (IMT). To assess the quality of life the Seattle questionnaire was used for patients with angina pectoris. The frequency of angina attacks and the number of nitroglycerin tablets used by patients were studied.

Results: Daily monitoring of arterial stiffness during the treatment has shown a significantly decreased aortic augmentation index, reduced to HR (Aixaore) 10,5 (0,5; 27) to 4.5 (-8; 19), which accounted for 42.9 % ($p < 0,05$) and tended to decrease the aortic pulse wave velocity. By ultrasound carotid IMT showed a decrease from 1,01 ± 0,15 to 0,9 ± 0,12 mm ($p < 0,05$) (10% decrease). When analyzing the results of questionnaires to assess the quality of life in patients with CAD at 24 weeks the decrease in the frequency of angina attacks by 28,3 %, as well as reducing the number of tablets used by patients (27.4 %) was found.

Conclusions: Aggressive therapy with atorvastatin 80 mg per day is accompanied by a significant decrease in arterial stiffness, intima-media thickness and improves the quality of life in patients with proven coronary artery disease.

PP.22.13 INDEPENDENT PREDICTORS OF CARDIOVASCULAR COMPLICATIONS IN PATIENTS WITH UNSTABLE ANGINA AFTER CORONARY BYPASS

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Objective: To identify independent predictors of risk of early postoperative major cardiovascular events (MACE) in hypertensive and non-hypertensive patients with unstable angina (UA).

Design and method: Our study included 60 patients with UA who underwent coronary artery bypass surgery on a beating heart. In group 1 included 32 patients without arterial hypertension (AH), age 55,2±4,2 years. In 2 group - 28 hypertensive patients with UA, age 56,4±4,4 years. All patients underwent coronary angiography, Echocardiography, Holer ECG monitoring, 24-hours blood pressure monitoring, biochemical blood analysis (we determined C-reactive protein (CRP), von Willebrand factor (vWF), B-type natriuretic peptide (BNP), cardiac troponin I (CTI), level of myeloperoxidase (MPO)).

Results: Development of acute heart failure (AHF) in the early postoperative period was observed in 6 patients of group 1 (18.7%), in 4 patients of 2 group (14,2%). Perioperative myocardial infarction occurred in 3 patients of 1 group (9,3%) and in 3 patients of 2 group (10,7%). Mortality within 1 month of follow-up after coronary bypass surgery in 1 group was 3,1%. In 2 group were no deaths.
As a result of all the above methods of examination, we found that independent predictors of MACE (AHF, MI, death) after coronary bypass grafting on beating heart in patients with UA without AH are index of local myocardial contractility (ILMC)>1,6 points (sensitivity 55%, specificity -95%), end-systolic index (ESI) >63,4 ml/m² (sensitivity 70,5%, specificity -70%), BNP >535 pg/ml (sensitivity 73%, specificity -86%). Indepedent predictors of MACE after bypass grafting on beating heart in hypertensive patients with UA are level of MPO >360 pg/ml (sensitivity 88%, specificity -94%), CRP >8,5 g/l (sensitivity 76,4%, specificity -81,6%), duration of ischemia per day according Holter ECG >99 min per day (sensitivity 65%, specificity -91%).

Conclusions: The main independent predictors of the risk of MACE in the early postoperative period (follow-up 1 month) in hypertensive patients with US are level of MPO, CRP and duration of ischemia per day according Holter ECG; in non-hypertensive patients with UA are ILCM, ESI, BNP level.

PP.22.14 INDEPENDENT PREDICTORS OF CARDIOVASCULAR COMPLICATIONS IN PATIENTS WITH MYOCARDIAL INFARCTION IN BYPASS GRAFTING

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Objective: To identify independent predictors of early postoperative major adverse cardiovascular events (MACE) in patients with Q-myocardial infarction (QMI).

Design and method: The study included 76 patients with QMI complicated by postinfarction angina. These patients underwent coronary artery bypass grafting in conditions of artificial blood circulation up to 1 month from onset of QMI.
I group - 28 patients (36,8%) without arterial hypertentsion (AH), age 56,27,2 years. II group -48 patients (63,2%) with AH, age 57,4±6,4 years. All patients underwent coronary angiography, Echocardiography, Holter ECG monitoring, biochemical analysis of blood to the definition of C-reactive peptide (CRP), cardiac troponin I (CTI), myeloperoxidase (MPO), von Willebrand factor (vWF), B-type natriuretic peptide (BNP).

Results: In the early postoperative period acute heart failure (AHF) developed in 1 group in 10 patients (38,4%); in 2 group -in 12 patients (25%). Mortality in 1 group was 7,1%; in 2 group were no deaths. Independent predictors of the risk of MACE (AHF, MI, death) after coronary bypass grafting in hypertensive patients with QMI are ejection fraction of left ventricle (EFLV)<37,6% (sensitivity -72,5%, specificity-85,6%); CTI >7,5

ng/ml (sensitivity -88,5%, specificity -92,6%), level of MPO >380 pg/ml (sensitivity -80,0%, specificity -91%), CRP >8,5 g/l (sensitivity -80,4%, specificity -89,5%). Independent predictors of the risk MACE after bypass in patients with QMI without AH are index of local myocardial contractility (ILMC) >2 points (sensitivity -81%, specificity-89,4%), end-systolic index (ESI) >60,3% (sensitivity -78,5%, specificity-90,7%), ejection fraction of right ventricle (EFRV) <40,4% (sensitivity -77,8%, specificity-96,4%), BNP >735 pg/ml (sensitivity -83,0%, specificity-96,0%), vWF >200% (sensitivity -75,6%, specificity-94,6%).

Conclusions: The main independent predictors of the risk of MACE in early postoperative period after coronary bypass grafting in hypertensive patients with QMI are EFLV, CTI, level of MPO and CRP; in non-hypertensive patients with QMI - EFRV, ESI, ILMC, BNP and vWF.

PP.22.15 INFLUENCE OF ENHANCED EXTERNAL COUNTERPULSATION ON BLOOD PRESSURE AND HEART RATE IN HYPERTENSIVE PATIENTS

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Objective: To study the impact of the Enhanced External Counterpulsation (EECP) on blood pressure (BP) and heart rate (HR) in hypertensive patients with coronary heart disease (CHD).

Design and method: The study included 13 hypertensive patients with CHD (7 men, 6 women), age 62±2,4 years. All patients received ACE inhibitors, beta-blockers, statins, aspirin. Patients underwent EECP of 36 procedures in 1 hour. BP and HR were measured before and after each session of EECP. Tolerability was very good in 100% patients. The study used non-parametric statistical methods.

Results: The results of changes in BP and HR before and after EECP presented in Table 1.
Sistolic BP (SBP), diastolic BP (DBP) and HR decreased significantly in the whole group of treated patients and 36 procedures during EECP in each patient individually.
In all patients ,as a result of EECP treatment decreased the initial class of angina and significantly decreased the number of nitroglycerin tablets taken per week.

Table 1. Changes in blood pressure and heart rate before and after EECP

Data	Baseline Me [25%, 75%]	After EECP Me [25%, 75%]	p
SBP, mm Hg	138 [120; 155]	130 [116; 141]	p<0,0001
DBP, mm Hg	80 [75; 90]	80 [70; 90]	p<0,0001
HR, beats per min	64 [62; 76]	62 [58; 69]	p<0,0001

Conclusions: EECP is a highly effective noninvasive treatment for hypertensive patients with CHD. EECP application in complex treatment of hypertensive patients with CHD optimized the heart and BP and can improve the quality of life of this patients.

PP.22.16 IMPACT OF HYPERTENSION ON LATE POST-REPERFUSION ABORTION OF ELECTROCARDIOGRAPHIC SIGNS OF ST ELEVATION MYOCARDIAL INFARCTION IN PATIENT WITH MULTIVESSEL CORONARY ARTERY DISEASE

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Objective: Objective of the study was to investigate the predictors of late post-reperfusion abortion of electrocardiographic signs of ST elevation myocardial infarction (STEMI), because the early or late abortion of STEMI signs is important challenge of reperfusion therapy, especially in patients with multivessel coronary disease (MVD).

Design and method: A retrospective analysis of 12 months post-reperfusion period of 77 patients treated by primary percutaneous coronary intervention (PPCI) was performed using the data of ST segment and T wave resolution and evolution of QRS score, calculated from serial 12 lead ECG, registered before, after PPCI, after 1 and 7 days, and after 1, 6 and 12 month after PPCI. Echocardiography examination was performed at discharge and after 12 months. Severity of MVD was evaluated by Syntax score (SXS). Patients with full abortion of ECG STEMI signs after 12 months were selected to 1st group (n=35), and patients with not resolved QRS score (6.42 ± 3.17; p<0.00001), ST dislocation (1.05 ± 1.37 mm; p<0.00001) with inverted T wave were selected to 2nd group (n=42).

Results: The majority of initial characteristics of 1st and 2nd groups as the age, summarized ST elevation, left ventricle ejection fraction (LVEF), myocardial mass index (MMI), end diastolic diameter index (EDDI) and SXS had no significant difference. However in 1st group of patients the pre- interventional QRS score (1.1 ± 1.76 vs 5.1 ± 3.38; p<0.0001), systolic arterial pressure (133.9 ± 27.2 vs 148.2 ± 26.2 p<0.03) and diastolic arterial pressure (79.9 ± 13.6 vs 92.1 ± 13.9; p<0.0003) were significantly lower. After 12 months these groups were different not only according to all ECG characteristics, but patients of 1st group had additionally the higher LVEF (40.5± 7.95 vs 48.28 ± 6.23; p<0.00001), lower MMI (92.6± 16.5 vs 106.5± 20.1 p<0.003) and EDDI (22.5 ± 2.38 vs 24.8 ± 3.3; p<0.002).

Conclusions: The large initial myocardial injury zone and elevated pre-interventional arterial pressure may be considered as negative predictors in achievement of late post-reperfusion abortion of ECG signs in patients with STEMI and MVD.

PP.22.17 HIGH DENSITY LIPOPROTEIN CHOLESTEROL LEVEL AND SEVERITY OF CORONARY ARTERY DISEASE IN ASIAN PEOPLE

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Objective: Blood level of low density lipoprotein cholesterol (LDL cholesterol) is the major risk factor of coronary artery disease (CAD). Low high density lipoprotein cholesterol (HDL cholesterol) level is one of risk factors of CAD in western countries. Mean HDL cholesterol level of Korean people is much lower than those of western or other Asian countries. But the prevalence of CAD is lower than those of western or other Asian countries.The aim of this study was to investigate impact of HDL cholesterol level on prevalence and severity of CAD diagnosed in Korean People whose prevalence of CAD was much lower than those of western or other Asian countries.

Design and method: The subjects were 1884 Korean patients received the coronary angiography. The severity of CAD was determined by the number of involved vessels and Friesinger Score on angiography. The effects HDL cholesterol level on the development and severity of CAD were analyzed according to stratified subgroup and mean HDL cholesterol level.

Results: As HDL cholesterol level decreased, the odds ratio of CAD prevalence increased proportionally. The patients with HDL cholesterol < 30mg/dL had 3.4 times higher risk than patients with HDL cholesterol >= 60mg/dL. The mean HDL cholesterol level was 43.5mg/dL, 41.0mg/dL, 38.5mg/dL, 37.5mg/dL respectively in the control group (without CAD), 1-vessel disease (VD), 2VD, 3VD. Even the subgroup analysis among patients with LDL cholesterol < 100mg/dL showed the significant correlation between HDL cholesterol level and the severity of coronary artery disease. The HDL cholesterol level was found to have significant negative association with Friesinger score (r=-0.201, P<0.001).

Conclusions: HDL cholesterol level was significantly associated with the prevalence and severity of CAD on coronary angiography in Korean people whose prevalence of CAD was much lower than those of western or other Asian countries.

PP.22.18 PLASMA B-TYPE NATRIURETIC PEPTIDE AND COMPLEXITY OF CORONARY ARTERY DISEASE ASSESSED BY SYNTAX SCORE

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Objective: To determine the association between B-type natriuretic peptide (BNP) levels and complexity of coronary disease (CAD) assessed by Syntax score.

Design and method: This was a prospective study that recruited 112 patients with clinical suspect of CAD undergoing angiography during January to December 2010 (63 male y 49 females), aged between 36 to 89 years (60,52 ±10,0). Basal BNP was measured. Ejection fraction was quantified by ventriculography or echocardiography. Standard coronary angiograms were performed. Images were analyzed by expert angiographers to determine Syntax score. The association between BNP and Syntax score was evaluated by Pearson correlation. To determine if plasma levels of BNP predicted the complexity of the CAD lineal regression analysis was performed.

Results: Median BNP levels was 34.6(14.0-76.7) pg/ml, these were significantly higher in patients with CAD compared with those without CAD (44.90(18.4-87.6) vs. 19.15 (9,2-45,2) pg/ml; respectively, P<0.001). The concentration of BNP in control group and groups with CAD of 1, 2 and 3 vessels was 24.15(9.27-45.2), 41.25(16.4-86.5), 36.0(17.65-105.75) and 65.7(31.8-86.4) pg/ml, respectively; P=0.013. BNP was significantly higher in patients with involvement of the Left Anterior Descending Artery (LDA) (52.0 pg/dl (23, 35-99.85) vs. control 23.7 pg/dl (11.6-52.0); P<0.001. We found a significant positive correlation between BNP with the Syntax Score (r = 0.212, P=0.0244).BNP was correlated with adverse features of Syntax score as location of the lesion in LAD (r = 0.310, P= 0.001), total occlusion of the LAD (r = 0.271, P = 0.004), and the data of occlusion in LAD (r =-0.195, P=0.040). Moreover, BNP was significantly correlated with the presence of side branch >1.5 mm in Right Coronary Artery (RCA) (r=0.241, P=0.010), occlusion of the Left Circumflex Artery (LCX) (r=0.249, P=0.008) and number of lesions in LCX (r=0.204, P=0.031). BNP predicted the complexity of CAD (Model 1: Score Syntax= 2.188+2.873(log BNP), R2=4.5; Model 2: Score Syntax= -1.136+6.991(gender) +2.699 (log BNP), R2=9.8).

Conclusions: BNP is a predictor of the complexity of CAD and adverse features assessed by Syntax score. The analysis of BNP can be helpful and effective for risk stratification of patients with CAD.

PP.22.19 TIMELINESS AND ACCURACY OF ONSET THROUGH SECURE SUCCESS

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Objective: The evaluation of patients with STEMI and mortality risk stratification according to available clinical indices in pre-hospital.

Design and method: This research presents a retrospective study that includes the data concerning the anamnesis, physical examination from 235 patients with the diagnosis of STEMI during the year 2009. All patients were examined and treated at pre-hospital level by the Emergency Medical Assistance Service, Chisinau.

Results: From 235 patients 132 patients had following complications: cardiogenic shock - 65 (49%), cardiac dysrhythmias - 36 (27%), acute cardiogenic pulmonary edema - 20 (15%), also at the same time appeared acute cardiogenic pulmonary edema with dysrhythmia or dysrhythmia and shock - 12 (9%). The mortality of patients with STEMI in pre-hospital and intra-hospital period is the following one 124 died (52.77%) of the men - 58 (42%), and 66 -women (58%).
The mortality in the first 24 hours - 62 (50%) of them in pre-hospital period, in the next 24 hours - 35 (28%) and in-hospital next period - 27 (22%) patients.
Causes of death: cardiogenic shock - 69 (55.6%), acute cardiogenic pulmonary edema - 47 (38%) and cardiac dysrhythmia - 8 (6.45%).
The patients who are over 70 years, high Killip class, heart rate, low systolic and first medical contact during high up at the request of medical services were identified as the most important independent predictors of early mortality.

Conclusions: Risk stratification of patients with STEMI should begin with the first medical contact.
Mortality of patients with STEMI varies major depending on clinical variables of the first medical contact. This is intended to identify those patients with major life threatening state AI/NSTEMI and STEMI where treatment should be aggressive and early in order to reduce mortality and other cardiovascular adverse events in the nearest future of coronary event. Teaching people is a decisive factor requiring specialized medical aid because of insufficient knowledge of the onset of symptoms of STEMI by the patients and their relatives and failure of resuscitation measures witnesses probably lead to the large number of deaths until the medical personnel arrive

PP.22.20 BLOOD PRESSURE CONTROL IN BULGARIAN POPULATION WITH CORONARY HEART DISEASE

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Objective: The aim of this study was to analyse the blood pressure control in Bulgarian patients with proven coronary artery disease and to compare the data from 2007 and 2013.

Design and method: We analyse data from Bulgarian cohort with proven coronary artery disease included in both surveys EUROASPIRE (European Action on Secondary and Primary Prevention by Intervention to Reduce Events) III and IV, held in 2007 and 2013. The protocols of EUROASPIRE III and IV trials comprise standard questionnaires used by all participating into the trial countries to determine the patient health status.

Results: Bulgarian patients with coronary artery disease in EUROASPIRE III have a mean blood pressure 138.5/83.5 mmHg, 47.6% have blood pressure levels >140/90 mmHg, 79.6% are taking antihypertensive medication. The patients with coronary artery disease in EUROASPIRE IV have a mean blood pressure 132.2./77.4 mmHg, 30.8% have blood pressure levels >140/90 mmHg, 7.5% have blood pressure >160/100 mmHg, 94.1% are on antihypertensive therapy.

Conclusions: During the last 5 years there has been a tendency to improve control of blood pressure in patients with proven coronary artery disease in Bulgaria. We have registered an increase of prevalence of blood pressure control <140/90 mmHg and of the patients on antihypertensive therapy.

PP.22.21 THE ROLE OF HORMONAL DISTURBANCES IN THE DEVELOPMENT OF ARTERIAL HYPERTENSION IN THE FEMALE POPULATION

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Objective: It is known that the prevalence of hypertension (AH) and coronary heart disease (CHD) incidence in men than in women. However, with the onset of menopause, this difference is erased in favor of women. 55-58 % of women have hypertension occurrence coincides with the onset of menopause. Today, however, insufficient data on the role of hormonal disorders or age in the development of arterial hypertension.
To determine the role of hormonal disturbances on the development of hypertension in the female population.

Design and method: We examined 200 women with coronary artery disease who were selected as a result of epidemiological (99 women) and clinical examination 101 persons. All patients measured blood pressure (BP) and heart rate. The criteria used AH values recommended by WHO (1999), with BP >= 140/90 mmHg.
The study included a range of hormonal study the following hormones: estradiol (E), progesterone (P), testosterone (T), cortisol (C). We analyzed the correlations between traditional risk factors and sex hormones in women with CHD

Results: We conducted a correlation analysis between hormones - E, P, T, K, and AH did not reveal the presence of significant connections between them, but the emergence of hypertension contributes to such an important physiological process of the female body as the presence or absence of the menstrual cycle. This is evidenced by us revealed significant inverse relationship between the stored cycle and hypertension (r = - 0,4; p <0,01) in different age periods. Thus, women of the same age the risk of hypertension is higher in persons with menopause than those who kept menstrual cycle.

Conclusions: The risk of hypertension is higher in persons with menopause, regardless of age and hormonal changes.

PP.22.22 THE PREDICTIVE VALUE OF SYSTOLIC AND DIASTOLIC BLOOD PRESSURE IN ACUTE CORONARY SYNDROME

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Objective: In the spectrum of acute coronary syndrome (ACS) is well known the value of systolic blood pressure (SBP) on admission as an independent predictor of cardiovascular events. The aim of this study was to characterize the value of SBP and diastolic blood pressure (DBP) on admission by ACS.

Design and method: Retrospective observational analysis of 431 patients admitted on a coronary intensive care unit with acute coronary syndrome for 2 consecutive years. Patients were followed-up until the 31st October 2013 or until another event (new acute coronary syndrome, stroke, heart failure, arrhythmia or cardiac death).

Results: The study included 431 patients with 72.4 % male, mean age 67 ± 13 years, 71 % with Hypertension. The most prevalent diagnosis for admission was acute myocardial infarction (MI) without ST-segment elevation, followed by MI with ST- segment elevation and unstable angina. During follow up 73 events were recorded. Comparing male patients versus female, men showed higher value of DBP with no significant difference regarding SBP or heart rate (HR). Younger patients (<55 years) had higher value of DBP compared to older. Comparing diabetic versus nondiabetic patients, diabetics had higher value of SBP and HR. Curiously smokers and patients with history of alcoholism had lower SBP. In a parallel analysis comparing anemic patients versus non – anemic, anemic showed higher value of SBP and lower DBP. Through

the One-Way ANOVA test was found with statistical evidence that the levels of SBP and DBP differ according to Killip's class and left ventricular ejection fraction (LVEF). However on cox multivariate analysis adjusted to potential confounding factors (sex, age, diabetes mellitus, hypertension, dyslipidemia, obesity, smoking, prior events, HR, SBP and DBP at admission, admission glycemia, number of vessels envolved, LVEF and Killip class) only admission glycemia, LVEF and SBP were sustained as independent predictors of cardiovascular events(with respective Hazzard Ratio of 1,01; 2,05;1,01 p <0,03).

Conclusions: The value of SBP and HR is recognized in ACS risk scores, the question that arises is whether the DBP should also be considered in these scores especially in younger patients.

PP.22.23 EVALUATION OF AORTIC STIFFNESS IN PATIENTS WITH CORONARY ARTERY DISEASE AND THE RELATIONSHIP BETWEEN SYNTAX SCORE

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Objective: It was shown in several studies that arterial stiffness is a predictor of hypertension, stroke, cardiovascular events and mortality. The parameters of arterial stiffness were studied in many different patient groups and also in patients with coronary artery disease. But a few clinical studies indicate a relation between Syntax Score, is a tool used to determine severity of coronary artery disease (CAD), and arterial stiffness parameters. Purpose of this study is to demonstrate a relationship between aortic stiffness parameters and Syntax score in patients with coronary artery disease.

Design and method: Fifty patients with were included in the study. Coronary angiography was performed for all patients due to coronary artery disease suspicion. Patients were subdivided into two groups as patients with coronary artery disease (n=31) and patients without coronary artery disease (n=19). Syntax score was calculated in patients with coronary artery disease.Arterial stiffness was assessed non-invasively by using TensioMed Arteriograph.

Results: Arterial stiffness parameters were found to be higher in coronary artery disease group, but did not achieve statistical significance . Mean PWVaortic of patients with coronary artery disease was 10.5 ± 2.7 while it was 10.1 ± 2.3 in patients without coronary artery disease. And also arterial stiffness determined by PWV is not related to CAD severity assessed by angiography and the SYNTAX score. In hypertensive patients with or without coronary artery disease , there was a strong correlation between PWVao, aortic pulse pressure (PPao) and hypertension. Respectively mean aortic PWV, PPao of patients with hypertension were 10.9 ± 2.6 , 56 ±22 while they were 9.6±2.1, 39.8±12 in patients without hypertension.

Conclusions: Several non-invasive techniques are being used to detect arterial stiffness and predicting coronary artery disease. These tecniques are required to be easily applicable and to have a high positive predictive values. Still no tests are effective enough to predict coronary artery disease in all patients. So always there's a need for additional methods in diagnosis. But the fact that, a strong correlation between arterial stiffness and hypertension. And study is still ongoing for increasing the number of patients.

PP.22.24 HYPERTENSION IN WOMEN: SYMPTOM PRESENTATION ASSOCIATED WITH CORONARY ARTERY DISEASE

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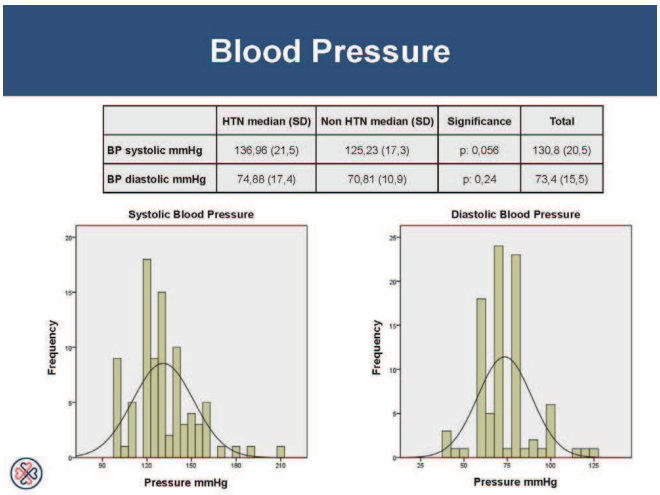
Objective: To evaluate the association between symptom presentation of coronary artery disease with coronary angiography results in hypertensive (HTN) women.

Design and method: Observational and retrospective study of women patients admitted to our medical institution between April and September 2009 for acute coronary syndrome (ACS) or probable ACS evaluated with coronary angiography. According to ACS and Hypertension International Guidelines, patients were categorized as having typical and atypical chest pain and hypertension. Baseline characteristics and treatment were registered. It was analized the association of symptom presentation with coronary angiography results. Patients with valve disease that performed preoperative coronary angiography were excluded.

Results: A cohort of 148 women (median age 66.5 ± 10.4) were evaluated with coronary angiography, and 130 patients were included: 10 (6.8%) with ST-segment elevation myocardial infarction (STEMI), 106 (71 %) with non ST-segment elevation myocardial infarction (NSTEMI), and 14 (9.5%) with probable ACS. Prior history of coronary artery disease was found in 25% of patients. Overall 90 women (60.8%) were HTN. There were no significant differences respect to the atypical symptom presentation between HTN and no HTN (26.7% vs. 25.5%, p 0.85) versus typical (73% vs. 74% p = 0.8). Patients with hypertension had a higher incidence of lesions in coronary angiography (64.4% vs. 37%, p = 0.001, OR 3.08, 95% CI 1.52 to 6.21).



Conclusions: The HTN women increased three times the risk of finding lesions in coronary angiography. HTN was not significantly associated with atypical symptom presentation compared with non HTN. Should be beneficial the prevention of hypertension in women at an early age.

PP.22.25 HYPERTENSION IN PATIENTS UNDERGOING CORONARY ARTERY BYPASS GRAFTING: PREVALENCE AND ASSOCIATED FACTORS

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Objective: On several series of patients with coronary arterial disease admitted for coronary artery bypass grafting, arterial hypertension (AH) is the most prevalent cardiovascular risk factor. This study aimed to identify the prevalence of hypertension and factors associated in coronary disease patients undergoing coronary artery bypass grafting (CABG).

Design and method: A cross-sectional study that included 3010 patients undergoing CABG in the period 07/08/09 to 07/26/10 in a large hospital in São Paulo, SP, Brazil. Individuals with a diagnosis registered in the medical chart were considered hypertensive. Arterial hypertension was considered the variable response categorized as yes or no. The independent variables were divided into socio-demographic (gender, age, race, and funding source of hospitalization), associated cardiovascular risk factors (diabetes, dyslipidemia, smoking, obesity, family history) and other diseases associated (chronic obstructive pulmonary disease, chronic kidney disease, peripheral arterial disease, cerebrovascular disease). For statistical analysis the chi-square test or Fisher's exact test were used to verify equal proportions of categorical variables between interest groups and analysis of variance for continuous variables. Variables with p <0.20 were selected to integrate the multiple regression model. In the final model, the level of statistical significance adopted was p <0.05.

Results: The prevalence of hypertension was 82.8%. By the criterion p <= 0.20 the characteristics of gender, age, race, BMI, DM, DLP, creatinine were selected for multivariate analysis. Of these variables, gender, age, race, overweight, diabetes, dyslipidemia, and creatinine remained in the final model. The odds are demonstrated in Table 1 (following page).

Multiple regression of factors associated with arterial hypertension i ng to CABG.

Variable	Category	Odds Ratio	IC - 95%		p value
Age		1.01	1.00	1.02	0.037
	Men	1.00			-
Gender	Female	1.77	1.39	2.25	<0.001
	White	1.00			-
Race	Black	1.07	0.66	1.76	0.777
	Mixed	1.53	1.07	2.19	0.020
	Asiatic	0.95	0.39	2.33	0.903
	< 25	1.00			-
BMI	25 - 30	1.04	0.84	1.29	0.729
	>= 30	1.53	1.13	2.06	0.005
Diabetes	No	1.00			-
	Yes	1.90	1.52	2.39	<0.001
Dyslipidemia	No	1.00			-
	Yes	1.51	1.23	1.85	<0.001
Creatinine	<= 1.3	1,00			-
	> 1,.3	1,37	1,09	1,72	0,007

Conclusions: In patients undergoing coronary artery bypass grafting, systemic arterial hypertension reported an association with the following factors: age, female gender, mixed race, overweight, diabetes, dyslipidemia, and creatinine.

PP.22.26 COHORT STUDY OF HYPERTENSIVE PATIENTS UNDERGOING MYOCARDIAL REVASCULARIZATION: QUALITY OF LIFE ASSESSMENT

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Objective: Studies have shown the negative impact of arterial hypertension on health-related quality of life. The aim of the present study was to assess quality of life of hypertensive patients submitted to myocardial revascularization before surgery and 30 days after surgery.

Table 1. Quality of life of hypertensive and non-hypertensive patients before CABG

Quality of Life	Hypertensive (%)			Non-hypertensive (%)		
Domains	No problems	Some problems	Extreme problems	No problems	Some problems	Extreme problems
Mobility *	65	32.1	2.9	89.6	10.3	0
Self-care	86.9	12.6	0.5	96.5	3.4	0
Usual activities	55.2	41.4	3.4	44.8	55.2	0
Pain/ discomfort	41.2	51.5	7.2	27.6	62.1	10.3
Anxiety/depression	48.8	40.4	10.8	44.8	41.4	13.8

* p<0.05

Table 2. Quality of life of hypertensive patients, before and after CABG

Quality of Life	Hypertensive (%) Before CABG			Non-hypertensive (%) After CABG		
Domains	No problems	Some problems	Extreme problems	No problems	Some problems	Extreme problems
Mobility *	65	32.1	2.9	73,7	23,4	2,9
Self-care *	86.9	12.6	0.5	76,8	20,4	2,9
Usual activities	55.2	41.4	3.4	53,5	41,6	4,9
Pain/ discomfort	41.2	51.5	7.2	35,7	58,9	5,4
Anxiety/depression *	48.8	40.4	10.8	58,7	34,8	6,6

* p<0.05

Design and method: This was a cohort study with prospective data collection. Health-related quality of life was assessed for 623 patients registered in the database of heart surgery of a large hospital in São Paulo, SP, Brazil. Health-related quality of life was assessed before surgery and 30 days after the procedure using Euroqol (EQ-5D), a generic instrument consisting of five domains: mobility, self-care, usual activities, pain/discomfort and anxiety/depression. In each question, the respondent had three alternatives: no problems, some problems, or extreme problems. Values of $p<0.05$ were considered significant.

Results: Before surgery, hypertensive patients reported more problems in the mobility dimension when compared to non-hypertensive patients. Regarding the patients reporting no problems, the difference was statistically significant (65% vs 89.6%, p=0.02) (Table 1). At 30 days after surgery, hypertensive patients reported significant quality of life improvement ($p<0,05$) in the dimensions of mobility and anxiety/depression (Table 2). There was no change ($p>0.05$) in the quality of life of non-hypertensive patients in any of the dimensions assessed.

Conclusions: Hypertensive coronaropathic patients hospitalized for myocardial revascularization report worse quality of life in the mobility domain compared to non-hypertensive patients. However, after surgery, hypertensive patients were more likely to present changes in quality of life.

PP.22.27 PROGNOSTIC VALUE OF THE OXYGEN UPTAKE EFFICIENCY SLOPE IN PATIENTS WITH CORONARY ARTERY DISEASE

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Objective: Maximal exercise capacity is established as an independent predictor for mortality in patients with coronary artery disease (CAD). However, sometimes exercise tests are stopped prematurely due to medical and motivational reasons and for these cases submaximal exercise measures like the oxygen uptake efficiency slope (OUES) have been introduced in order to interpret the exercise capacity. So far, it remains unclear whether the OUES and other submaximal measures can predict mortality. Therefore the aim of this study was to assess the prognostic value of the OUES in patients with CAD.

Design and method: In this analysis, we report data on 1239 patients with CAD (age 60.6 ± 9.8 years; 1045 male, 185 female), who underwent cardiopulmonary exercise testing at the occasion of enrollment in the ambulatory cardiac rehabilitation program between 2000 and 2011. Oxygen uptake efficiency slope (OUES), was calculated by robust regression analysis and corrected for body weight. Follow-up information on mortality was obtained by checking the patients' medical files or by contacting the patients' general practitioners. Cox proportional-hazards multiple regression analysis were used to assess the relation between submaximal exercise variables and cardiovascular mortality.

Results: During a follow-up of 7.3 ± 3.2 years (range 0.25 to 13.6 years), 141 patients died. At single Cox analysis, OUES was significantly related to all cause (hazard ratio: 0.999, $p<0.01$) and cardiovascular(hazard ratio: 0.999, $p<0.05$) mortality. On multiple Cox regression analysis, OUES (hazard ratio: 0.923, p=0.003) remained significantly related with all cause and cardiovascular mortality, along with age (hazard ratio: 1.046, $p<0.01$ and hazard ratio: 1.005, $p<0.01$).

Conclusions: The OUES is an independent predictor for all cause and cardiovascular mortality in patients with CAD.

PP.22.28 ADIPOKINES OF VISCERAL ADIPOSE TISSUE AS POSSIBLE PREDICTORS OF STENOTIC COMPLICATIONS AFTER CORONARY BYPASS

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Objective: Visceral fat the amount of which significantly increases in metabolic syndrome (MS), is considered as hormonally active organ. Adipokines of visceral adipose tissue including adiponectin, resistin and leptin are able to contribute of development of stenotic complications after myocardium revascularization.
Purpose: to evaluate influence of adipokines visceral adipose tissue on development of stenotic complications and also to determine the predictive threshold values for important predictors for prognosis the development of complications in patients with MS after coronary artery bypass grafting (CABG).

Design and method: Study included 59 man (56,8±6,1) with angina and MS. Levels of adipokines was measured by immune-enzyme analysis before CABG. Coronary computer tomographic angiography was performed in a year after CABG.

To all patients laboratory research with determination of the metabolic risk factors of visceral fat (leptin, resistin, adiponektin).

Results: It was revealed that in patients clinic of angina occurred aged 53,9±6.9 years, CABG was performed at the age of 55,6±6,1 years. Was revealed that levels of leptin is 18,3 (11,1; 24,1) (p<0,001) ng/ml, adiponektin 12,3±0,66 mrg/ml (p<0,001), resistin 15,0±0,64 ng/ml (p<0,001).
Discrimination analysis was conducted to assess the influence of investigated factors on development of stenotic complications. So the greatest contribution in development of complications was carrying resistin (Lambda Wilkes - 0,53, p=0,19) and leptin (Lambda Wilkes - 0,63, p=0,001).
By ROC – analysis it was revealed that cut-off of leptin more than 21,1 ng/ml (sensitivity 88,2%, specificity 81,0%), for resistin more than 18,7 ng/ml (sensitivity 47,1%, specificity 83,3%).

Conclusions: Thus, in patients after CABG and MS level of leptin more than 21,1 ng/ml is predictor of stenotic complications with high degree of specificity and sensitivity.

PP.22.29 VALUE OF THE PARAMETERS OF THE LIPID PROFILE AND LIPOPROTEIN RATIOS FOR PREDICTION OF RESTENOSIS AFTER CORONARY ARTERY STENTING

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Objective: Patients with coronary artery disease associative with metabolic syndrome (MS) have high risk of restenosis after stenting (PCI). Atherogenic dislipidemia can significant contribution to increase risk restenosis after PCI. Evaluation of coronary risk based only on determination of the individual parameters of lipid profile is not optimal.
The purpose was to study predictive value of atherogenic lipid profile, including apolipoprotein A1 (Apo A1), apolipoprotein B (apo B), and lipoprotein (a) [Lp (a)] and lipoprotein ratio on restenosis after PCI in patients with MS.

Design and method: The study included 74 patients with angina pectoris II - IV functional class in age of 35 to 70 years. Patients were divided into 2 groups according to presence or absence of MS: Group 1 (31) - MS, group 2 (43) - no MS. Among all patients before PCI were determined levels of parameters lipid profile by immunoprecipitation methods. In addition were determined lipoprotein ratio (total cholesterol (TC)/high density lipoprotein cholesterol (HDL–C), Apo B/Apo AI, low density lipoprotein cholesterol (LDL – C)/HDL – C). Through the one year after PCI multi - slice computed tomography of coronary artery was made in all patients.

Results: In the group with MS was revealed high levels of atherogenic TC, LDL, TG, Apo B, Lp(a), leptin, resistin and also was revealed high levels all measured lipoprotein ratio (TC/HDL-C, LDL-C/HDL-C, Apo B/Apo AI). According to the results of discriminant analysis was revealed that HDL – C (Lambda Wilkes=0,49; p=0,17), Lp(a) (Lambda Wilkes =0,24; p<0,001), TC/HDL-C (Lambda Wilkes =0,27; p<0,001) are predictors of restenosis after PCI. By ROC-analysis was revealed, that sensitivity for Lp(a) was 100%, specificity – 81,1%. ROC-curve was > 615 mg/dl (p=0,0001). In the time ROC-curve, specificity, sensitivity for HDL-C was <0,89 mmol/l, 78,4%, 58,3% and for TC/HDL-C >7,11, 94,6%, 75,0% respectively.

Conclusions: In patients with angina pectoris associated with MS observed formation of dyslipidaemia with statistically significant increase in the levels of atherogenic lipids, including apolipoprotein B, Lp (a) and increase levels of lipoprotein ratio. The levels of Lp(a) > 615 mg/dl and TC/HDL-C >7,11 are predictors of restenosis after PCI.

PP.22.30 HYPERTENSION WAS NOT A PREDICTOR OF CLINICAL EVENTS AT ONE-YEAR IN PATIENTS WITH ACUTE ST-SEGMENT ELEVATION MYOCARDIAL INFARCTION WHO UNDERWENT PRIMARY CORONARY INTERVENTION

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Objective: Hypertension is a well-known risk factor for atherosclerosis. However, data on the effect of hypertension in patients with acute ST-segment elevation myocardial infarction (STEMI) are inconsistent. This study aimed to evaluate the effect of hypertension on mid-term clinical outcomes in patients with acute STEMI undergoing primary percutaneous coronary intervention (PCI).

Design and method: A total of 10,302 patients with acute STEMI who underwent primary PCI were derived from the Korea Working Group on Myocardial Infarction registry from 2005 through 2012. Follow-up data were collected around one year after primary PCI. Primary study endpoint was the composite of major adverse clinical outcomes (MACE; defined as death, myocardial infarction, or revascularization after the index PCI) at one-year.

Results: Hypertension was documented in 4,783 (46.4%) patients at history taking. Patients with history of hypertension were associated with more male (p<0.001), more anterior location of ischemia (p<0.001), more advanced Killip class (p<0.001), and more incidence of previous coronary heart disease (p<0.001), diabetes (P<0.001), and dyslipidemia (p<0.001), compared to patients without history of hypertension. The composite of MACE at one-year were significantly higher in patients with history of hypertension than in patients without it (12.8% vs. 10.6%, p<0.001). In multivariable analysis after correcting confounding factors, the presence of history of hypertension was not an independent predictor for the composite of MACE at one-year (HR 2.839, CI 0.577-13.971, p=0.199). Furthermore, high blood pressure at arrival in emergency department was not associated with increased composite of MACE regardless of the presence of history of hypertension. High blood pressure at arrival had a tendency decreasing the incidence (10.1% vs. 12.5%) and risk (HR 0.869, CI 0.719-1.05, p=0.146) of the composite of MACE, compared to normal or low blood pressure at arrival.

Conclusions: This study showed that the presence of history of hypertension was not a predictor of clinical events at one-year after PCI in patients with STEMI. Furthermore, high blood pressure at arrival had a tendency decreasing clinical events at one-year compared to normal or low blood pressure at arrival.

PP.22.31 EFFECTIVENESS OF PHYSICAL REHABILITATION PROGRAM IN HYPERTENSIVE PATIENTS AFTER ACUTE MYOCARDIAL INFARCTION (A COOPERATIVE RUSSIAN TRIAL)

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Objective: Explore the clinical efficacy of physical rehabilitation program in patients (pts) with arterial hypertension (AH) after acute myocardial infarction (AMI) in A COOPERATIVE RUSSIAN TRIAL.

Design and method: 206 hypertensive pts after 3-8 weeks of AMI and standard therapy were randomized into 2 groups (gr): the main Rgr (n = 102, age 53±7 years), performing a one-year program of physical training (PT) average intensity (50-60%) 60 minutes duration 3 times per week, and a control – Cgr (n = 104, age, 53±7 yrs). AMI with ST elevation was 70% in Rgr of pts and 66% in pts in C gr.

Results: In a year it was noticed, that according to bicycle stress test in Rgr increased the time of exercise stress (+ 38 %, p <0.001) and load capacity (+43%, p <0.001) with no change in Cgr. The ejection fraction of left ventricle significantly increased after PT (by 7.6%, p <0.001), decreased systolic (-2.6%, p <0.05) and diastolic blood pressure (-4.7%, p <0.001) without significant changes in these parameters in pts in Cgr. In trained pts daily physical activity has increased (+13.1%, p <0.01) and has not changed in Cgr of pts. In Rgr number of angina attacks and the number of intake nitroglycerin tablets for one week decreased (respectively + 48 %, p <0,001 and 54 %, p <0.01); in Cgr no changes. Patients in Rgr after 1 year had increased level of HDL-Ch (13 %, p < 0.001), and decreased atherogenic LDL-Ch/HDL-Ch ratio (-17%, p <0.05), in front of pts in Cgr with significantly increased triglycerides (22 % , <0.001) and LDL-Ch/HDL-Ch (+17%, p <0.05). The total number of cardiovascular events in Rgr were 12 vs 24 in Cgr (p <0.05), the number of disability days due to the worsening of CHD based on per person per year were 1,9 vs 4,9 (p < 0.05).

Conclusions: Application year program of physical cardiorehabilitation on standard medical therapy in hypertensive patients after AMI led to increased physical performance, reduced risk of cardiovascular events, restoration of working capacity and improvement of quality of life.

PP.22.32 SUBENDOCARDIAL VIABILITY INDEX OBTAINED BY APPLANATION TONOMETRY AND CHANGES OF MYOCARDIAL PERFUSION BY SCINTIGRAPHY ARE NOT CORRELATED

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Objective: To evaluate the correlation between the indexes obtained by applanation tonometry, particularly SubEndocardial Viability Ratio (SEVR) and changes on myocardial perfusion scintigraphy in patients with cardiovascular risk factors.

Design and method: We studied 52 patients (average age 63.8 ± 11 years and 31 men (59.6%)) with indication of myocardial perfusion scintigraphy for evaluation of suspected coronary artery disease (CAD), where the measures of applanation tonometry (SphygmoCor ®) were obtained on the same day before the exam. Statistical analysis aimed to evaluate the correlation between the tonometric index and scintigraphy criteria by appropriate tests.

Results: Myocardial perfusion scintigraphy analysis revealed alteration in 23 individuals (44.2%), being 11 (47.8%) with persistent defect, 7 (30.4%) with transitional defect and 5 (21.7%) with mixed defect. When compared between groups with or without change in myocardial perfusion scintigraphy, SEVR was similar (164.7 ± 32 vs. 162.3 ± 22; p = 0.77). Other indices obtained by applanation tonometry, as the increment index (AIx), ejection duration and augmentation pressure (AP) were also not different between the groups with or without change in scintigraphy: AIx (30 ± 8 vs. 29.8 ± 12; p = 0.67), (33.7 ± 4 vs. 34 ± 3 ms; p = 0.81) and AP (15 ± 6 vs. 15 ± 10 mmHg; p = 0.97).

Conclusions: The subendocardial viability index obtained by the analysis of the pulse wave by applanation tonometry showed no correlation with changes of myocardial perfusion scintigraphy in patients suspected of CAD.

PP.22.33 VASCULAR REMODELING IN HYPERTENSIVE PATIENTS: ROLE OF FIBROSIS

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Objective: Remodeling of large and small arteries contributes to the development and complication of hypertension, however ultrastructural evidence of these processes in human myocardium remains obscure.
The aim was to reveal some of the changes involved in the vascular remodeling in hypertensive patients.

Design and method: Biopsy specimens of 5 patients (age range 62-79) who suffered from HT II-III stage and post myocardial infarction (MI) were obtained during coronary artery bypass grafting (CABG) in comparison to myocardial transtorax express necropsies from 12 patients (age range 45-79) who died from MI without hypertension. Biopsy and necropsy specimens were examined by electron microscopy.

Results: During electron-microscopy examination of myocardial arteries in patients who suffered HT II-III stage and post MI, endothelial cells (EC) and smooth muscle cells (SMC) are hypertrophied. Lumen of the arteries is narrowed, resulting in cardiomyocite hypoperfusion. Growth of cardiomyocites (CMC) as well as interstitial and perivascular fibrosis contribute to vascular remodeling in hypertension. Vascular fibrosis entails accumulation of collagen, elastic fibers and other extracellular matrix components in the vessel wall and is an important aspect of extracellular matrix remodeling in hypertension. In contrast to above mentioned changes, in comparative group, apoptosis of EC and necrosis of EC and SMC are prevalent changes in arteries. Reparative fibrosis as the consequence of CMC necrosis is more often prevalent.

Conclusions: Remodeling of arteries may initially be adaptive, but eventually it becomes maladaptive and compromises organ function, contributing to cardiovascular complications of hypertension. Remodeling is very important therapeutic target and reversing remodeling and preventing fibrosis is probably powerful predictor of improvement.

PP.22.34 WHICH IS THE BLOOD PRESSURE TARGET AFTER AN ACUTE MYOCARDIAL INFARCTION? IS LOW BLOOD PRESSURE HARMFUL?

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Objective: Nowadays it's recommended to treat patients after an acute myocardial infarction (AMI) with Angiotensin Converting Enzyme Inhibitors and Beta Blockers. This groups of drugs don't interfere just with cardiac remodeling but have also impact in patients' blood pressure.
Our goal was to try to find if there is influence of blood pressure values in one year mortality and hospital admission's among patients that suffered an AMI.

Design and method: A prospective sutdy was performed, evolving 240 patients admitted to a cardiology ward with AMI diagnosis, between January of 2011 and December of 2012. An ambulatory blood pressure monitoring (ABPM) was determined 1 month after AMI. One year follow-up was performed with a phone call. The statistical analysis of 1 year events was realized with SPSS 20.0.

Results: Of the 240 patients, 175 were men, 49% of the patients had an AMI with ST segment elevation.
On ABPM 27% of patients presented a 24h mean systolic blood pressure (MSBP) value>130mmHg and 18% <110mmHg; 14% presented 24h mean dyastolic blood pressure (MDBP) value>80mmHg and 60%<60mmHg; 81% were "dipper".
During the follow-up 32 patients had an hospitalization, 24 for cardiovascular reasons.
We found an association between hospitalization for cardiac reasons and nocturnal systolic blood pressure (SBP) >120mmHg (p<0.01), nocturnal diastolic blood pressure (DBP) >65mmHg (p<0.05), a MSBP>130mmHg (p<0.05), a MDBP>80mmhg (p<0.05), and a "non-dipper" profile (p<0.01).
We couldn't find differences between patients with a daily SBP <110mmHg or a nocturnal SBP <100mmHg.
The only value that was found to be an independent predictor of hospitalization was a nocturnal SBP > 120mmHg.
During the one year follow-up, 4 patients died (1,7%), no relationship was found between ABPM and mortality.

Conclusions: 1. Hospitalization for cardiovascular reasons after an AMI is associated with 25h mean BP above 130/80mmHg, and nocturnal BP above 120/65mmHg.
2. Values less than 110mmHg of SBP daytime ang night below 100mmHg were not associated with higher rates of hospitalization.
3. A "dipper" profile is associated with less hospitalizations.
4. Our study does not confirm that after an AMI there is a J curve relating arterial blood pressure and cardiovascular events.

PP.22.35 CLINICAL FEATURES AND PROGNOSIS OF ACUTE CORONARY SYNDROME IN PATIENTS WITH AND WITHOUT SYSTEMIC HYPERTENSION

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Objective: The role of systemic hypertension in acute coronary syndrome (ACS) has not been well studied. The aim in this study was to evaluate possible differences between hypertensives and normotensives presenting with ACS in terms of baseline characteristics, presentations, and outcomes.

Design and method: We enrolled 100 consecutive subjects admitted to the cardiology department of Charles Nicolle hospital (Tunis, Tunisia) with symptoms of ACS.
In this observational study we compared clinical features, clinical immediate outcomes and 6-month follow-up data.

Results: Hypertensives represented 50% of the total population. In general, hypertensive patients were older than normotensives (65±11 vs 55±11 years), more often women (38% vs 8%), and had more comorbidities, such as dyslipidemia (32% vs 6%), angina (20% vs 2%) and diabetes (56% vs 48%). At admission, hypertensives had higher systolic and diastolic blood pressure. Hypertensives had fewer incident of acute myocardial infarction (AMI) (34% vs 54%) than normotensives. Hypertensives received more oral cardiovascular drugs, and had undergone more invasive procedures (percutaneous coronary intervention and coronary artery bypass grafting). Hypertensive had more atrial fibrillation and heart failure during hospitalization. However, at 6-month follow-up, adverse events were equivalent in hypertensives and normotensives, suggesting no continuing differential treatment benefit for hypertensives in the months after the initial ACS episode.

Conclusions: Systemic hypertension worsens the immediate and short-term pronosis of patients with ACS. Optimal management of hypertensive patients and other risk factors may improve prognosis.

PP.22.36 THE INFLUENCE OF PRE-HYPERTENSION ON LONG-TERM MAJOR ADVERSE CARDIAC EVENTS IN PATIENTS WITH ACUTE MYOCARDIAL INFARCTION AND IMPAIRED LEFT VENTRICULAR SYSTOLIC FUNCTION

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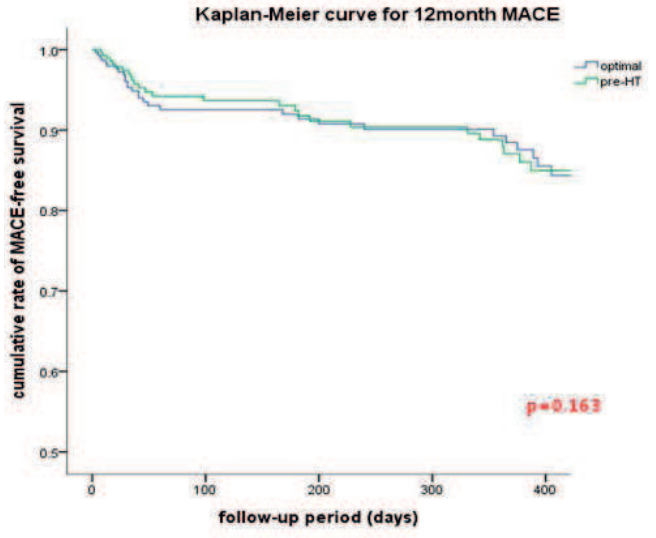
Objective: Pre-hypertension (HT) is known as an important predictor for incidence of coronary artery diseases. However, data about the independent prognostic value of pre-HT on long-term major adverse cardiac events (MACE) in the setting of acute myocardial infarction (AMI) with impaired left ventricular (LV) systolic function remains lack.

Design and method: Using data from Korean nationwide myocardial infarction registry, a total of 811 patients who were diagnosed with acute myocardial infarction, had no history of previous hypertension and whose LV ejection fraction (EF) was lower than 45%. The eligible patients were classified into two groups according to initial systolic blood pressure (sBP) : optimal group (sBP<120 mmHg and diastolic BP (dBP) < 80 mmHg; n=432, 53.3%) vs pre-HT group (120<=sBP<140 mmHg or 80<=dBP<90 mmHg; n=379, 46.7%). We compared the incidence of MACE which was defined as all cause mortality, repeated MI, and revascularization in each group. In addition, we investigated the predictive value of pre-HT for MACE with multivariable Cox regression analysis.



Results: Baseline clinical and angiographic characteristics in the two groups were almost similar, but patients in pre-HT group had higher BMI, LVEF (35.9% vs 37.0%, p=0.024) and lower C-reactive protein level. The initial sBP was 103.9 vs 123.8 mmHg in each group (p<0.001). Total incidence of MACE was similar between the two groups, which was 13.4% and 9.3% in optimal and pre-HT group, respectively (p=0.088). However, among the individual components, pre-HT group showed significantly lower non-cardiac death (3.1% vs 0.9%, p=0.039) and revascularization rates (5.0% vs 1.8%, p=0.021). After adjusting confounding factors pre-HT showed the tendency of reducing MACE occurrence, though there was not a statistical significance (HR 0.69, 95% CI 0.402-1.184, p0.178).

Conclusions: This study showed that the existence of pre-HT at admission might have preferable clinical outcomes in previously normotensive patients with AMI and impaired LV systolic function. More studies are needed to determine the optimal initial BP under these situation.

PP.22.37 BETA BLOCKER THERAPY AND NATRIURETIC PEPTIDE LEVELS IN PATIENTS WITH HEART FAILURE AND PRESERVED EJECTION FRACTION. RESULTS FROM CIBIS ELD STUDY

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Objective: N-terminal pro brain-natriuretic peptide (NT-proBNP) is closely related to left ventricular (LV) dimensions, function and mass, and a valuable diagnostic and prognostic tool in patients with heart failure (HF). Significance of the natriuretic peptides in patients with hypertension and preserved LV systolic function (diastolic HF) is largely unknown. The objective of our study was to investigate the influence of optimizing beta blocker therapy on the NT-proBNP levels and blood pressure in patients from the CIBIS ELD study with diastolic HF.

Design and method: CIBIS ELD study included 297 patients from Germany (age 74 years, 46% male, 63% with diastolic HF) and 579 patients from Southeastern Europe (age 72 years, 71% male, 11% with diastolic HF). Prior to randomization participants had to be clinically stable and to be beta-blocker naive or on less than 25% of the guideline-recommended target or equivalent dose. We then titrated the beta blocker (either bisoprolol or carvedilol) up to maximum tolerated dose over three months.

Results: Systolic and diastolic blood pressure significantly decreased during the study (146.5±22.9 vs. 132.2±18.7 mmHg, p<0.001; 81.05±12.1 vs. 75.8±10.1 mmHg, p<0.001) while NT-proBNP insignificantly increased (1662.3±802.4 vs. 1692.8±780.4 ng/L, p=0.7). Left ventricular ejection fraction insignificantly increased (58.6±8.8 vs. 59.0±8.2%).

Conclusions: It has been demonstrated in previous studies that the plasma level of NT-proBNP is significantly increased in patients with essential hypertension and preserved LV systolic function. In our analysis of patients from CIBIS ELD study with diastolic HF we found that by increasing the dosage of beta blockers and reducing the systolic and diastolic blood pressure during 12 weeks NT-proBNP unexpectedly increased. Further investigations are needed on the influence of beta-blocker therapy and blood pressure reduction on natriuretic peptide levels in patients with diastolic HF.

POSTERS' SESSION

POSTERS' SESSION PS23
CLINICAL TRIALS - GUIDELINES

PP.23.01 NATRIURESIS AND BLOOD PRESSURE REDUCTION IN HYPERTENSIVE PATIENTS WITH DIABETES MELLITUS: THE NESTOR STUDY

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Objective: To determine the respective role of diabetes mellitus and sodium balance on the antihypertensive effect of the diuretic indapamide compared with the angiotensin blocker enalapril in hypertensive subjects with diabetes.

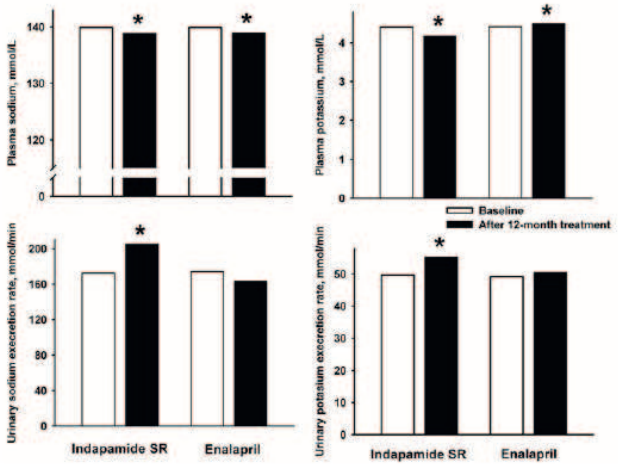
Design and method: A clinical trial of 565 patients was randomly selected to receive each day either indapamide 1.5 mg or enalapril 10 mg for one year. Brachial blood pressure (BP) and plasma and urinary electrolytes were measured at baseline and at the end of follow-up. Sodium and potassium level and excretion were measured on overnight urinary collections.

Results: After 12-months treatment, systolic, diastolic, mean and pulse BP were significantly and similarly decreased under both drugs (P<0.001), but magnitudes of BP reduction were constantly higher with indapamide than with enalapril, mainly for systolic (P=0.051) and pulse pressure (P=0.02) in patients over 60 years. Age, body mass index (BMI), diabetes duration and plasma sodium reduction were significant and independent contributors to BP reduction by indapamide, but not enalapril. Positive regression coefficients were observed for age and plasma sodium reduction (P<0.009) but negative ones for BMI and diabetes duration (P<0.008). Similar findings were observed for pulse pressure, and results did not differ whether BP reduction was measured in absolute or per cent values. Finally, only indapamide, but not enalapril, significantly increased urinary sodium and potassium excretion (P<0.02).

Conclusions: Under indapamide, age and increased sodium excretion contributes to the antihypertensive effect of hypertensive subjects with diabetes, whereas diabetes duration and BMI rather favor increased stiffness and weight gain.

Figure. Effect of Indapamide SR and enalapril on sodium and potassium metabolism after 12-month treatmen

Values of sodium and potassium metabolism were presented in the Indapamide SR and enalapril treatment groups, separately, and compared by student's t-test between the values at baseline and after 12-month treatment.



PP.23.02 A DIFFERENT WAY TO ADJUST COVARIATES IN COX MODEL AND LOGISTIC REGRESSION IN FELODIPINE EVENT REDUCTION (FEVER) STUDY DATA ANALYSIS

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Objective: Many multicentre, double-blind, randomized, placebo-controlled, parallel group trials, including Felodipine Event Reduction (FEVER) study, have reported their characteristics of the participants at baseline. Usually two or more treatment groups have almost the same numbers of participants and sex ratios are non-significant statistically However male and female numbers in each group are different significantly, The same things are also for smoking, age, BMI, and so on. Usual adjusted covariates were included in the models but we have created a pseudo- population instead of the original population to complete the adjustments.

Design and method: Felodipine Event Reduction (FEVER) study randomized 9711 Chinese hypertensive patients to more or less intense anti- hypertensive treatment for 40 months, with outcome monitoring. 22 Baseline patient characteristics were reported. Using LOGISTIC regression, we have calculated inverse-probability-of- treatment weighting (IPTW) for each participant. So we created pseudo-population , on which the proportional hazard models and LOGISTIC regression performed.

Results: In The Fig.,It is a Table ,there are hazard ratios(HR) for events, which are all cardiovascular events (fatal and non-fatal), stroke (fatal and non-fatal), all cardiac events (fatal and nonfatal), cardiovascular death.
Data in the Table are only for Smoking vs. Non-smoking subgroups.Tables on Effects of sex, age, BMI, …, etc were also calculated, but omitted here.

Table. Effects of Smoking(Yes vs No) on 4 incidences for original or pseudopopulation,HR(95%CI), P

EVENT	Original population				Pseudo-population			
	HR	LOW	UPPER	P	HR	LOW	UPPER	P
All CV events	1.219	1.011	1.471	0.0382	1.221	1.080	1.381	0.0015
All strokes	1.289	1.040	1.599	0.0207	1.304	1.132	1.501	0.0002
Car. events	1.025	0.734	1.433	0.8840	0.921	0.730	1.163	0.4900
CV death	1.044	0.737	1.478	0.8092	1.017	0.807	1.282	0.8858

Conclusions: MSM allowed to adjust unbalanced subgroup factors, when the factor's events are considered. In FEVER study, outcomes before and after MSMs using on subgroup variables have similar trend. As MSM results in references, the HR are renewed, P values and 95% confidence intervals are less than without MSMs.

PP.23.03 RESEARCH OF THE SPOT URINE METHOD IN ESTIMATING 24-HOUR URINARY SODIUM IN HYPERTENSIVE PATIENTS

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Objective: To develop an equation to estimate 24-hour urinary sodium by using spot urine in Chinese hypertensive patients and explore its applicability.

Design and method: A total of 510 hypertensive patients were recruited, including 340 cases set up by the new equation and 170 cases as the equation validation groups. 24-hour urinary sodium(24HUNa), 24-hour urinary creatinine(PRCr),

spot urinary sodium(SUNa) and creatinine(SUCr) for two times were measured for creating an equation (SUN) predicted 24h urinary sodium by spot urine. And applicability of the equation were evaluated simultaneously. To examine the deviation, precision and accuracy of the equation, we compared the estimated values (e-24HUNa) and the measured values (r-24HUNa).

Results: (1)The improved equations (SUN) for predicting 24HUNa using spot urine were as follows: PRCr(mg/day) = 13.41× body weight(Kg) +14.49 × height(cm) – 12.22 × age – 1406.3; SMU (second morning spot urine): e-24HUNa = 34.12 × [(SUNa/SUCr)×PRCr]0.27; PM (late afternoon or early evening spot urine): e-24HUNa = 23.01×[(SUNa/SUCr)×PRCr]0.34. (2) The equation showed smaller deviation and higher accuracy compared with Kawasaki's and Tanaka's method, especially when salt intake of patients was less than 12g/day, but was not suitable for patients whose salt intake was greater than 12g/day.

Conclusions: The improved equation (SUN) showed a better applicability in estimating 24-hour urinary sodium excretion in Chinese hypertensive patients, with a small deviation and high precision and accuracy. The equation of SMU were more convenient to estimate 24h urinary sodium. It was suitable for hypertensive patients with salt intake less than 12g/day.

PP.23.04 GLUCOSE METABOLISM AND BLOOD PRESSURE CONTROL STATUS IN PROFESSIONAL HYPERTENSION CLINICS IN CHINA

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Objective: To investigate the glucose metabolism status, cardiovascular risk factors distribution and blood pressure control rate in patients who were diagnosed and treated in the professional hypertension clinics in China.

Design and method: A cross-sectional survey was conducted to 32004 patients in 127 professional hypertension clinics across the country. The questionnaire included the history of associated diseases and its treatment conditions. Physical examination and biochemical tests were also performed at the same time.

Results: 1)The mean blood pressure was 150.34/92.21mmHg in all the patients. 3424 patients (10.7%) had never taken any anti-hypertension medicine. Among patients treated with anti-hypertension drugs, 19818 cases received mono-therapy(69.3%) and 8762 cases received combination therapy(30.7%). The most frequently used drug was renin-angiotensin system inhibitors, followed by calcium-channel blockers. About 15.6% patients had taken fixed compound preparations. 2)The overall blood pressure control rate (<140/90 mmHg) was 26.8%, which was 27.7%, 30.0%, 25.4% and 21.3% in patients complicated with coronary heart disease, diabetes mellitus, kidney diseases and cerebral stroke respectively. 3)About 70.3% hypertensive patients had abnormal glucose metabolism whose mean GHbA1c was 7.84% which was much higher than 7.0% , the target value defined by ADA, even among them, 20.2% had not taken any anti-diabetic drugs. 4)Low-risk and medium-risk patients accounted for 16%, 48.0% of high-risk and 36.0% of very high risk. About half of all patients had different target organ damages and about 49% of them had associated with clinical complications.

Conclusions: Hypertension complicated with abnormal glucose metabolism was widespread, more target organ damages and clinical diseases exist in these patients, but less than 30% of them had reached the target blood pressure. Low proportion of the combination therapy was one of the reasons of low blood pressure control rate. This showed that the effective management of blood pressure is inevitable.

PP.23.05 RELATIONSHIP BETWEEN 24H URINARY SODIUM WITH BLOOD PRESSURE, ARTERIAL ELASTICITY AND URINE PROTEIN IN HYPERTENSIVE PATIENTS

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Objective: To investigate the effects of hypertensive patients with high salt intake on blood pressure, arterial elasticity and microalbuminuria.

Design and method: 341 untreated patients with hypertension were collected. 24-hour urinary sodium (24HUNa) excretion, blood pressure, microalbuminuria and baPWV were observed in these patients. All of the patients were divided into three groups according to their 24h urinary sodium excretion (mmol/24h): A group (low urinary sodium, <=100mmol/24h) of 93 cases, B group (medium urinary sodium, 100<24HUNa<=200mmol/24h) of 171 cases and C group (high urinary sodium, >200mmol/24h) of 77 cases.

Results: (1)The 24h urinary sodium excretion (mmol/L) in three groups were 78.6±17.9, 146.7±26.9 and 254.7±41.8, corresponding to daily salt intake (g/day) were 4.7, 8.8 and 15.2, respectively. (2)The baPWV(cm/s) in high urinary sodium group was obviously higher than in low urinary sodium group (1753.5±303.8 vs 1604.9±339.9, P=0.028). Meanwhile, the increased level of blood pressure and microalbuminuria in high urinary sodium group were statistically higher than in the other two groups. In addition, multiple regression analysis showed that urinary sodium was an independent factor of baPWV(B=0.583,P=0.021). Urinary sodium had positive correlation with excretion of urinary protein (B=1.235,P=0.027).

Conclusions: Our study demonstrated that high sodium intake was independently associated with target organ damage. High sodium in coordination with hypertension can aggravate target organ damage.

PP.23.06 DIPYRIDAMOLE IN HEART FAILURE DUE TO DILATED CARDIOMYOPATHY: A PILOT STUDY

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Objective: Oral dipyridamole might be beneficial in heart failure (HF): it has been reported to improve symptoms in observational, small scale studies. The PROFESS study for secondary prevention of stroke observed a reduction in the risk of onset or worsening of HF with acetylsalicylic acid plus dipyridamole in comparison with clopidogrel. The present pilot study was aimed at assessing the clinical effects of a combination of sustained-release dipyridamole and acetylsalicylic acid versus acetylsalicylic acid alone on symptoms and ventricular function in HF due to non-ischemic dilated cardiomyopathy.

Design and method: 19 stable outpatients with non-ischemic HF – NYHA class II, ejection fraction <40%, normal coronary arteries – were randomized to add-on therapy with acetylsalicylic acid, 25 mg (ASA), or acetylsalicylic acid 25 mg plus dipyridamole 200 mg (ASA+DIP), twice daily. They were evaluated at baseline and after 6 months for symptoms, echocardiographic ejection fraction, and exercise capacity through 6-minute walk test.

Results: Eleven subjects were in the ASA group and 8 in the ASA+DIP group. Dyspnea improved, without differences between the two arms: n=6/5/0/0 for NYHA I/II/III/IV in ASA, n=4/3/1/0 in ASA+DIP. Ejection fraction increased in both groups (ASA: from 34 [28-35]% to 40 [32-46]%; ASA+DIP from 32.5 [25.75-34] to 36 [31.5-46]%) without differences between arms. No change in exercise capacity and perceived exertion, as meters walked or points in the Borg scale, was observed. In a similar population, an adequately powered study would need to recruit 38 subjects.

Conclusions: The study does not suggest an usefulness of dipyridamole plus acetylsalicylic acid, compared to the latter alone, in HF due to dilated cardiomyopathy. While this appears in contrast with previous studies, the strict inclusion criteria, the study design, and the use of simple clinical end-points give strength to our findings. A properly sized trial would be well within the capabilities of a single center.

PP.23.07 A RANDOMISED CLINICAL TRIAL ON THE EFFICACY OF TELMISARTAN AND NEBIVOLOL IN HYPERTENSIVE PATIENTS

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Objective: The aim of the study was to compare the long-term efficacy of telmisartan and nebivolol on 24h ambulatory blood pressure (ABP) levels. We also investigated for possible different effects of these two drugs with different BP lowering mechanisms on arterial stiffness.

Design and method: Subjects included in the study were never treated before for hypertension. The diagnosis of hypertension was confirmed by ABPM, excluding from randomization patients with white-coat hypertension. The patients were randomized to receive either telmisartan or nebivolol. 24h ABPM and assessment for arterial stiffness by carotid femoral pulse wave velocity (cf-PWV) were performed before inclusion to the study, at the first month and sixth month of follow-up.

Results: 53 consecutive patients with stage I hypertension according to office BP measurements were enrolled. 18 patients (34%) were excluded from the randomization because they were diagnosed with white-coat hypertension. 35 patients were randomised to receive either 40 mg telmisartan (18 patients) or 5 mg nebivolol (17 patients). Patients were re-examined one month after the initial visit with a second ABPM and arterial stiffness measurements. If the ABP remained in the hypertensive range, 40 mg telmisartan or 5 mg nebivolol was added. All patients were re-examined at six months. Two patients in the nebivolol and telmisartan groups were withdrawn for poor adherence to treatment and two patients in the nebivolol group for side effects. Statistical significant differences were found in both nebivolol and telmisartan group for office BP and 24h BP values between visits. Nebivolol also significantly reduced the heart rates. Central aortic BP and carotid-femoral pulse wave velocity were found significantly reduced at the 3rd visit in the telmisartan group, while remained unchanged in the nebivolol group. (Table)

	Visit	Telmisartan Mean	Telmisartan SD	Nebivolol Mean	Nebivolol SD
Office SBP(mmHg)	1	165,88	23,600	162,12	21,248
	2	151,46*	18,853	147,97*	14,042
	3	140,65*	22,929	143,14*	18,966
Office SBP (mmHg)	1	108,41	13,805	104,26*	12,154
	2	99,38*	13,779	95,71*	11,306
	3	92,47*	9,335	89,86*	9,347
Office heart rate (b/min)	1	80,78	11,978	84,50*	12,273
	2	79,14	10,993	74,29*	11,154
	3	81,94	11,893	74,00*	8,854
Average SBP 24h (mmHg)	1	152,193	22,3612	142,903*	10,5066
	2	138,461*	16,3291	132,867*	12,9862
	3	134,289*	11,2919	130,138*	12,5419
SD SBP 24h (mmHg)	1	18,464	4,1478	15,119*	3,3848
	2	15,226*	2,6264	13,094*	3,1490
	3	15,219*	2,2275	12,917*	3,1782
Average DBP 24h (mmHg)	1	95,297*	11,9981	92,297*	5,9789
	2	86,869*	8,4303	83,739*	8,9484
	3	82,185*	7,4958	82,325*	8,3536
SD DBP 24h (mmHg)	1	12,827	2,3030	12,300	2,4597
	2	12,766	1,8847	10,869*	2,6862
	3	12,930	2,0879	11,143*	2,0648
24h heart rate (b/min)	1	77,856	11,5346	82,320*	7,9340
	2	74,341	9,8451	72,025*	5,7304
	3	76,658	10,8114	69,439*	8,3189
Estimated Central Pulse Pressure mmHg	1	54,82	15,302	50,23	14,489
	2	44,38	5,781	48,86	10,302
	3	37,18*	13,310	47,50	7,106
C-F: PWV m/s	1	12,42819	2,940024	11,92283	1,912723
	2	11,60986	2,107243	12,19543	3,064809
	3	10,36576*	2,258557	11,79840	4,116483

* Statistically significant differences

Conclusions: Despite similar BP lowering effects on 24h ABP, telmisartan and nebivolol demonstrated differences in central BP and cf-PWV reduction during the six months of follow-up. ARB telmisartan was found superior to nebivolol in reducing arterial stiffness suggesting a possible role of the RAAS blockade in preventing future arteriosclerosis.

PP.23.08 THE PREVALENCE OF ACUTE MYOCARDIAL INFARCTION DURING GREEK FINANCIAL CRISIS IN THE CARDIOLOGY DEPARTMENT OF A CENTRAL HOSPITAL IN ATHENS

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Objective: Cardiovascular morbidity and mortality tend to increase during periods of crisis, such as war, social depression or natural disasters. The financial crisis that Greece is experiencing during the last years bears major social implications, such as unemployment and poor quality of life. The purpose of the present study was to investigate the prevalence of acute myocardial infarction (AMI) during the period of financial crisis.

Design and method: Two separate time periods were studied retrospectively regarding the prevalence of AMI in the Cardiology Department of a central Hospital in Athens. The period from 1.1.2003 until 31.12.2007 was considered the 'pre-crisis period', while the period 1.1.2008 until 31.8.12 was defined as 'crisis period'.

Results: The results are shown in Table 1.

Table 1

	Pre crisis period Male	Pre crisis period Female	Crisis period Male	Crisis period Female
Number of admissions	1903	1517	2015	1845
Number of AMI	444 (23.3%)*	221 (14.6%)*	569 (28.2%)*	412 (22.3%)*
<45 years old	66 (14.9%)†	39 (17.6%)†	89 (15.6%)†	94 (22.8%)†
Patients without social insurance	61 (13.7%)†	22 (10%)†	133 (23.4%)†	55 (13.3%)†
Patients without risk factors for coronary disease	31 (7.0%)†	15 (6.7%)†	42 (7.4%)†	29 (7%)†

*number and percentage of acute myocardial infarction cases on the total of admissions

† number and percentage on the total of acute myocardial infarction cases

Conclusions: The above results indicate an increase in the number of admissions due to AMI in both sexes during the 'crisis period' compared to the 'pre-crisis period'. This increase was statistically significant in women (P<0.001) but not in men. The prevalence of AMI was increased in patients younger than 45 years old during the 'crisis period', but the increase was statistically significant again only for women (P<0,01). The prevalence of AMI was also increased in males without social insurance (P=0.04).

PP.23.09 EVENING DOSING OF ANTI-HYPERTENSIVES TO REDUCE CARDIOVASCULAR EVENTS: A THIRD TYPE OF EVIDENCE BASED ON META-ANALYSIS OF RANDOMIZED TRIALS

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Objective: Among different clinic and ambulatory blood pressure (BP) measures, nighttime BP most strongly predicts cardiovascular events (CVEs). Further, a preliminary, open label, single center trial has shown reductions in CVEs from 1+ anti-hypertensives taken in the evening versus all anti-hypertensives taken in the morning. Do randomized trials with evening dosing produce greater risk reductions than those with usual dosing?

Design and method: A systematic review identified all clinic BP difference trials, classifying them as either evening dosing trials (EDTs) or usual dosing trials (UDTs). Additional EDTs were sought from drug-comparison trials. Random effects meta-analysis provided standardized hazard ratios (HRs) for cardiovascular events (CVEs) (coronary artery disease and stroke) for the EDTs and UDTs, and the ratio of these HRs provided the relative risk (RR) from evening versus usual dosing. To address possible non-BP related effects, additional analyses adjusted for drug class.

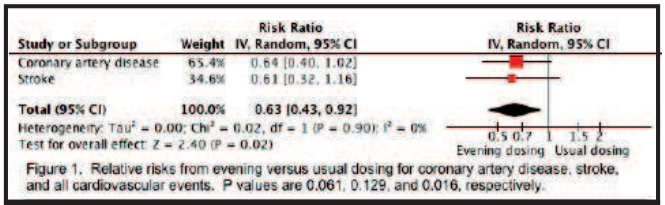

Figure 1. Relative risks from evening versus usual dosing for coronary artery disease, stroke, and all cardiovascular events. P values are 0.061, 0.129, and 0.016, respectively.

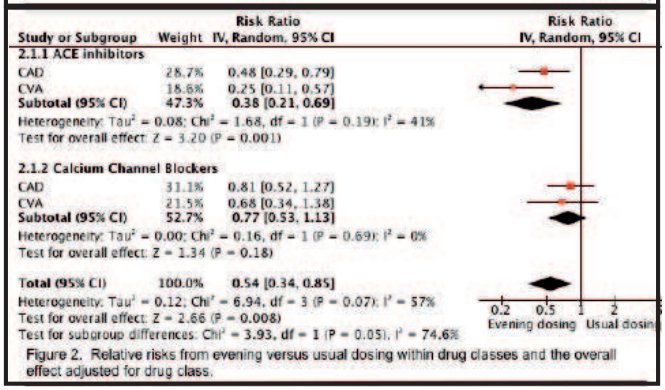

Figure 2. Relative risks from evening versus usual dosing within drug classes and the overall effect adjusted for drug class.

Results: 175 trials were identified and reviewed. Five EDTs were discovered (evening dosing medications are shown in parentheses): CONVINCE (con-

trolled onset verapamil), FACET (amlodipine), HOPE (ramipril), SystChina (nitrendipine), and SystEur (nitrendipine + or - enalapril). Total participants in the EDTs and UDTs were 35,075 and 312,057, respectively, and total CVEs were 2,320 and 18,129, respectively. Lengths of follow up for the EDTs were 2.5 to 5.3 years. HOPE had 6 of 7 features of study quality, while CONVINCE, Syst-China and Syst-Eur had 5 such features, and FACET had 4 such features. The RRs (95% confidence limits) for coronary artery disease, stroke, and all CVEs from evening versus usual dosing were 0.64 (0.40-1.02), P=0.061; 0.61 (0.32-1.16), P=0.129; and 0.63 (0.43-0.92), P=0.016, respectively. After adjustment for drug class, the RR for CVEs was 0.54 (0.34-0.85), P=0.008. Unlike the other EDTs, HOPE used just one anti-hypertensive (given prior to sleep), had the highest study quality, and gave the greatest risk reduction in sensitivity analyses.

Conclusions: This study provides a third type of evidence suggesting a substantial beneficial effect from evening dosing. Head-to-head, multi-center, double blind trials are needed to test this strategy.

PP.23.10 AMILORIDE LOWERS BLOOD PRESSURE AND INHIBITS PLASMINOGEN ACTIVATION IN TREATMENT RESISTANT HYPERTENSION

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Objective: In conditions with proteinuria, plasminogen is aberrantly filtered across the glomerular barrier and activated along the tubular system to plasmin. In the collecting duct, plasmin activates ENaC proteolytically which could link microalbuminuria/proteinuria to resistant hypertension. In vitro, amiloride inhibits urokinase-type plasminogen activator. It was hypothesized that amiloride inhibits urokinase-type plasminogen activator (uPA) and attenuates plasminogen activation in microalbuminuric urine and reduces blood pressure.

Design and method: In an open-label, non-randomized, 8- week intervention study, a cohort of subjects with treatment resistant hypertension and type 2 diabetes mellitus were included. 5 mg amiloride was added to previous triple antihypertensive treatment regime (including a diuretic and an inhibitor of renin-angiotensin-aldosterone system) and increased to 10 mg if blood pressure control at 4 weeks was not achieved.

Results: Complete dataset for urine analysis was available on 60 subjects. Both systolic and diastolic blood pressure measured by 24–h ambulatory and office monitoring were significantly reduced. Seven of 80 cases (9%) discontinued amiloride due to hyperkalemia >5.5 mol/l, which was the most frequent adverse event.
Urinary plasmin abundance was significantly reduced after amiloride treatment. Also urinary albumin creatinine ratio significantly decreased ($p<0.0001$).

Conclusions: Amiloride lowers blood pressure, plasminogen activation and albumin/creatinine ratio. In conclusion, amiloride is a relevant add-on medication for treatment of resistant hypertension in patients with type 2 diabetes and microalbuminuria.

PP.23.11 TREATMENT OF HYPERTENSIVE PATIENTS WITH DIABETES AND MICROALBUMINURIA WITH COMBINATION WITH INDAPAMIDE SR/AMLODIPINE: A RETROSPECTIVE ANALYSIS

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Objective: Combination treatments for hypertension most often include a RAAS inhibitor. However, high systolic blood pressure remains a challenge for a significant number of patients. Non-RAAS inhibiting strategies such as CCB/thiazide-like diuretic combinations may offer effective alternatives.

Design and method: Hypertensive diabetic patients with microalbuminuria were included in this retrospective analysis if they were uncontrolled on monotherapy (indapamide SR 1.5mg or enalapril 10mg) and had been given add-on amlodipine 5mg. Patients uncontrolled with monotherapy/amlodipine 5mg were uptitrated to 10mg. Amlodipine 5 mg was added to indapamide SR in 135 patients, (47.5% of randomised patients) with further uptitration to 10 mg in 62 patients; corresponding figures were 156, (55%) and 77 in the enalapril group.

Results: After 52 weeks, supine SBP/DBP had decreased from baseline by 25.7±12.8/13.7±8.8 mm Hg in the indapamide/amlodipine group and by 21.0±13. 9/11.4±8.6 mm Hg in the enalapril/amlodipine group ($p=0.006$ for SBP). Normalization and response was observed in 45.4% and 76.3% of patients in the indapamide/amlodipine group and in 41.1% and 71.2% of patients in the enalapril/amlodipine group, respectively. In the amlodipine 10mg subgroup, SBP/DBP decreased from baseline by 26.1±13.5/12.5±9.4 mm Hg in the indapamide/amlodipine group and by 20.5 ± 12.7/11.7±7.5 mm Hg in the enalapril/amlodipine group ($p=0.02$ for SBP). Response was observed in 72.6% of patients in the indapamide/amlodipine group and in 67.5% of patients in the enalapril/amlodipine group, respectively. Treatment was well tolerated. Few patients experienced edema, with no difference between groups. Changes in fasting glucose, lipids, kalemia, natremia, and creatinine clearance were also similar between groups.

Conclusions: The combination of indapamide SR and amlodipine demonstrated a synergistic effect on systolic blood pressure reduction leading to a superior control rate and equivalent tolerability to the combination of an ACE inhibitor and a CCB.

PP.23.12 EFFICACY OF AMLODIPINE BESYLATE IN THE 24 HOUR AMBULATORY BLOOD PRESSURE CHANGE, PULSE WAVE VELOCITY AND CENTRAL BLOOD PRESSURE

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Objective: The aim of this study was to evaluate the efficacy of Amlodipine besylate (Norvasc®) in the 24 hour ambulatory blood pressure change, brachial-ankle pulse wave velocity (baPWV) and central blood pressure (CBP).

Design and method: This study was a prospective, single center, open, non comparative clinical trial and included 26 patients were drug Naïve hypertensive (systolic blood pressure: 140-180 mmHg or diastolic blood pressure: 90-110 mmHg). Total study duration was 8 weeks. The definition of uncontrolled blood pressure was more than 140 mmHg of seated systolic blood pressure (SBP) or 90 mmHg of seated diastolic blood pressure (DBP) at office. If blood pressure was not controlled, they were titrated to the Amlodipine besylate 10 mg. 24 hour ambulatory blood pressure monitoring (ABPM), baPWV using automated device (VP-1000, Colin, Co. Ltd. Komaki, Japan) and CBP using SphygmorCor® device (AtCor Medical, Sydney, Australia) were done at baseline and after 8 weeks of treatment. Primary endpoint was attaining rate of less than SBP 135 mmHg on 24 hour ABPM.

Results: Attaining rate of SBP less than 135 mmHg on 24 hour ABPM after 8 weeks treatment of Amlodipine besylate was 75%. Amlodipine besylate effectively decreased office blood pressure, blood pressure on 24 hour ABPM, baPWV, CBP include AIx@75 after 8 weeks treatment of Amlodipine besylate significantly.

	Baseline	After 8 weeks	
SBP at office (mmHg)	162±11	135±10	P<0.001
DBP at office (mmHg)	102±7	86±9	P<0.001
SBP on 24 hour ABPM (mmHg)	145±9	132±8	P<0.001
DBP on 24 hour ABPM (mmHg)	94±7	84±7	P<0.001
baPWV (cm/sec)	1,569±252	1,333±363	P=0.001
SBP on SphygmoCor® (mmHg)	145±15	126±10	P<0.001
DBP on SphygmoCor® (mmHg)	97±9	86±7	P<0.001
AIx@75 on SphygmoCor® (%)	27±9	22±9	P<0.001

Conclusions: Administering Amlodipine besylate in patients with drug Naïve hypertensive for 8 weeks effectively decreased blood pressure on 24 hour ABPM, baPWV and CBP include AIx@75.

PP.23.13 COMPARING THE METABOLIC EFFECTS OF PERINDOPRIL/AMLODIPINE AND PERINDOPRIL/INDAPAMIDE COMBINATIONS IN HYPERTENSIVE PATIENTS WITH 2-TYPE DIABETES: RESULTS OF THE ACES STUDY

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Objective: Approximately 20% of hypertensive patients have 2-type diabetes. Therefore we must prefer antihypertensives with favorable or neutral metabolic effects in hypertensive patients with 2-type diabetes. Based on the available evidence, the thiazide-like diuretic indapamide seems to have neutral metabolic profile like calcium-channel blockers have.
The aim of the ACES substudy was to compare the efficacy and metabolic effects of combinations of perindopril/amlodipine and a perindopril/indapamide in hypertensive patients with 2-type diabetes.

Design and method: This study was a 6-month multicenter, prospective, observational, noninterventional, open-label clinical study. The data of 1709 outpatients (916 female, 793 male; mean age 64.2±10.5 years) with mild, moderate, or severe essential hypertension with 2-type diabetes were subjected to statistical analysis. At visits 1 (day 1), 3 (month 3), and 4 (month 6), the following metabolic parameters were monitored: fasting blood glucose, HbA1c, eGFR, total-, HDL-, and LDL-cholesterol, triglycerides, and serum potassium, sodium, creatinine, and uric acid levels. The following risk factors and/or comorbidities were reported: family history of cardiovascular disease 44.8%; dyslipidemia 64.1%; obesity 57.0%; smoking 23.8%; hyperuricaemy 23.2%; ischemic heart disease 37.7%; cerebrovascular disease 14.3%; peripheral artery disease 12.6%; retinopathy 10.5%; and chronic kidney disease 7.6%. A total of 942 patients took perindopril/amlodipine and 767 took perindopril/indapamide fixed-dose combination. Statistical analysis was carried out using the one-paired t-test and the Chi-square test; the two-sided level of significance was set at 0.05.

Results: The observed changes in the main metabolic parameters were favorable and similar in two therapeutic groups. The mean decrease in office blood pressure was also similar in two groups: -28.2/13,7 mm Hg in perindopril/amlodipine group and -26.9/13.5 mm Hg (visit 4 vs baseline; P<0.0001).

	Perindopril+amlodipine					Perindopril+indapamide				
Parameter	**n**	**Visit 1**	**Visit 4**	**Change**	**%**	**n**	**Visit 1**	**Visit 4**	**Change**	**%**
Total cholesterol (mmol/l)	469	5,53±1,06	4,97±0,79	-0,56±0,86	-10,1%	365	5,48±1,09	4,88±0,83	-0,60±0,97	-10,9%
Triglyceride (mmol/l)	465	2,17±0,93	1,80±0,81	-0,37±0,87	-17,1%	352	2,34±1,27	1,95±1,45	-0,39±1,56	-16,7%
Glucose (mmol/l)	483	7,51±2,06	6,71±1,40	-0,80±1,77	-10,7%	378	7,65±2,34	6,92±1,56	-0,73±1,85	-9,5%
Potassium (mmol/l)	417	4,49±0,53	4,44±0,44	-0,05±0,52	-1,1%	303	4,41±0,41	4,37±0,44	-0,04±0,50	-0,9%
Serum-creatinine (mmol/l)	407	88,57±23,17	87,34±23,18	-1,24±15,82	-1,4%	315	91,06±30,37	89,80±23,42	-1,27±17,49	-1,4%
HbA1c (%)	351	7,07±1,11	6,71±0,92	-0,36±0,93	-5,1%	238	7,06±0,86	6,80±0,75	-0,26±0,61	-3,7%
LDL-cholesterol (mmol/l)	192	3,12±0,92	2,76±0,71	-0,36±0,77	-11,5%	157	3,20±0,98	2,71±0,81	-0,49±0,78	-15,3%
HDL-cholesterol (mmol/l)	326	1,26±0,36	1,36±0,37	+0,10±0,30	7,9%	266	1,32±0,39	1,39±0,37	+0,07±0,28	5,3%
Uric acid (mikromol/l)	382	327,90±76,51	307,73±78,24	-20,17±70,59	-6,2%	278	339,28±81,90	314,37±71,69	-24,91±60,34	-7,3%
Natrium (mmol/l)	380	140,30±7,82	140,56±4,12	+0,25±8,20	0,2%	282	139,56±7,28	139,68±6,17	+0,12±8,81	0,1%
eGFR (ml/min/1,73 nm)	260	61,10±12,78	61,09±11,68	-0,01±7,12	0,0%	177	60,24±12,56	60,92±12,06	0,69±7,12	1,1%

Conclusions: We conclude that the metabolic profile of indapamide is very similar to the metabolically neutral and well-documented metabolic profiles of the calcium-channel blocker amlodipine and that both of the combinations studied had similar beneficial effects on the main metabolic parameters. In the other hand, the beneficial changes in metabolic parameters in these diabetic patients can be explained by cessation of previous drugs with metabolic side effects (metoprolol, HCTZ) also.

PP.23.14 COMPARISON OF SINGLE-PILL STRATEGIES FIRST-LINE IN HYPERTENSION: PERINDOPRIL/AMLODIPINE VERSUS VALSARTAN/AMLODIPINE

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Objective: An international double-blind, parallel-group, randomized controlled trial was performed to determine the efficacy and safety of a new first-line strategy in mild to moderate hypertension based on a single-pill combination of perindopril/amlodipine versus a validated stepped-care strategy (initiation with valsartan monotherapy, uptitrating to valsartan/amlodipine after 2 months).

Design and method: At inclusion, patients received perindopril/amlodipine 3.5/2.5 mg or valsartan 80 mg. At 1, 2, and 3 months, patients were uptitrated if they had uncontrolled hypertension (>=140/90 mm Hg). The uptitration steps were: perindopril/amlodipine 7/5 mg, 14/10 mg, and 14/10 mg plus indapamide sustained release 1.5 mg; or valsartan 160 mg, valsartan/amlodipine 160/5 mg, and 160/10 mg. The two groups were similar at baseline (55.5 years, 53% male; blood pressure 163.5/100.2 mm Hg); 881 perindopril/amlodipine and 876 valsartan/amlodipine patients were analyzed for efficacy.

Results: After 1 month, the rate of controlled hypertension was 33% with perindopril/amlodipine versus 27% with valsartan/amlodipine (estimate of difference, +6.1%, p=0.005); this difference remained significant at every visit (p<0.05). After 3 months, blood pressure was 137.8±12.4/83.3±8.7 and 139.7±13.3/84.8±9.0 mm Hg, respectively, with greater reductions from baseline with perindopril/amlodipine (primary endpoint, –2.0/–1.5 mm Hg, both p<0.001). Similar results were observed at all other visits (all p<=0.001). The safety of the two strategies was equivalent.

Conclusions: The three-step strategy of initiation with single-pill perindopril/amlodipine produces greater reductions in blood pressure, and better and quicker rates of control of hypertension. This can be expected to be associated with benefits beyond blood pressure control, notably improved compliance and better cardioprotection.

PP.23.15 THE COMPARISON OF COST-EFFECTIVENESS OF SUBLINGUAL ENALAPRIL VS SUBLINGUAL NIFEDIPINE FOR THE LOWERING OF HBP IN THE EMERGENCY DEPARTMENT

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Objective: To assess the cost-effectiveness and safety of two sublingual drugs for the treatment of hypertensive urgencies.

Design and method: 557 patients(pts) with high blood pressure(HBP), systolic blood pressure(SBP) >180 and diastolic blood pressure(DBP) >90mmHg, without signs of end-organ damage, contraindications to two drugs, who were admitted in the emergency department were enrolled in a prospective, single-blind study. The pts were selected to be treated with 20mg sublingual(s/l) nifedipine (n=314pts) and 20mg s/l Enalapril (n=243pts). Electrocardiographic(ECG), echocardiographic recordings and biochemical balance were obtained. Checkup of BP was made after 5', 10', 15', 30', 1h, 2h, 4h, and 6h after the treatment. End-point of the study was BP<150/90mmHg.

Results: There were significant differences between two groups of the pts with respect to the mean age(57,79 ± 10,98years for the nifedipine group vs 53,66 ± 11,15years for the enalapril group, p = <0,001), SBP at start(185,65±11,01mmHg vs 180,03±8,33mmHg, p = <0,001) and DBP at start (98,10±6,97mmHg vs 92,03±7,67mmHg, p = <0,001). After 20min, SBP for the nifedipine group was reducted of 36,77mmHg vs 34,90 mmHg for the enalapril group, p = NS. After 20min, DBP for the nifedipine group was reducted of 12mmHg vs 9,48mmHg for the enalapril group, p = <0,05. Heart rate significantly dropped in two groups, but more slowly in the enalapril group, p = < 0,000. Side effects were not observed during the treatment with two drugs. The cost of the treatment with nifedipine was 65,4euro vs 65,1euro for the enalapril group.

Conclusions: There was no significant difference between two drugs with respect to their antihypertensive effect on SBP, while sublingual nifedipine was more effective on DBP.

PP.23.16 COMPARISON OF EARLY EFFECTS OF ANTIHYPERTENSIVE MEDICATION AND REST AS BLOOD PRESSURE LOWERING MEASURE IN PATIENTS WITH HYPERTENSIVE URGENCY AT EMERGENCY DEPARTMENT ENTRY

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Objective: It is controversial whether the patients with hypertensive urgency without target organ damage (TOD) need rapid reduction of blood pressure (BP) by antihypertensive medication although the immediate reduction of BP by antihypertensive medication is essential in the patient with hypertensive emergency with TOD.

Design and method: Patients with hypertensive urgency at emergency department (ED) entry were randomly assigned to take telmisartan (40mg tablet, orally) or take a rest and BPs were reassessed every 30 minutes for two hours. The primary outcome was achievement of 10-30% reduction of mean BP compared to the mean BP measured during the ED entry. Secondary outcomes are more than 30% or less than 10% reduction of mean BP compared mean BP at ED arrival.

Results: Repeated measures analysis of variance showed that both systolic (F=29.102, P<0.001) and diastolic (F=19.249, P<0.001) BP significantly decreased in the two hours, but there was no significant difference between the medication and resting groups for both systolic (F=2.396, P=0.059) and diastolic (F=0.1.109, P=0.359) BP trends over time. There were no signifi-

cant differences in the both primary outcome and the secondary outcomes between the two groups.

Table 1. Patient characteristics at ED entry

	Rest n=45	Medication n=29
Age (years)	71.2 ± 10.5	75.5 ± 10.4
Men (%)	37 (82.2)	25 (86.2)
BMI (Kg/m^2)	24.6 ± 3.8	23.1 ± 2.99

None of the baseline parameters are significantly different between groups BMI, body mass index.

Table 2. Changes in systolic, diastolic, and mean BP over time.

	Rest n=45	Medication n=29	P
Systolic BP 0	181.3 ± 19.8	194.0 ± 19.2	0.008
Diastolic BP 0	101.9 ± 18.9	103.0 ± 13.7	0.783
SBP 30	159.3 ± 26.4	185.8 ± 28.2	0.000
DBP 30	87.0 ± 18.5	97.2 ± 11.5	0.010
SBP 60	152.7 ± 25.7	171.9 ± 28.6	0.004
DBP 60	81.4 ± 17.7	89.6 ± 12.8	0.033
SBP 90	150.2 ± 29.8	166.4 ± 28.7	0.018
DBP 90	80.6 ± 15.6	88.7 ± 12.9	0.023
SBP 120	149.1 ± 27.4	163.4 ± 26.5	0.030
DBP 120	80.6 ± 13.8	85.6 ± 15.5	0.217

BP, blood pressure.

Table 3. Complete statistical comparisons for variables presented in Table 2

	df	F	P
Between Group	1	13.356	0.004
SBP	4	39.102	0.000
SBP and Group	4	2.396	0.059
Between Group	1	6.271	0.015
DBP	4	19.249	0.000
DBP and Group	4	1.109	0.359
Between Group	1	12.529	0.001
MBP	4	37.146	0.000
MBP and Group	4	2.344	0.063

Table 4. Primary and secondary outcomes.

	Rest n=45	Medication n=29	P
Primary outcome:			
10-30% reduction of mean BP – n (%)	21 (46.7)	14 (48.3)	0.892
Secondary outcomes:			
<10% reduction of mean BP – n (%)	13 (28.9)	8 (27.6)	0.903
>30% reduction of mean BP – n (%)	8 (17.8)	6 (20.7)	0.755

Conclusions: As early treatment for patients with hypertensive urgency, having the patient taking a rest can be equally effective in lowering BP as the antihypertensive medication and it can be as effective and safe as the medication.

PP.23.17 BLOOD PRESSURE LOWERING EFFECT OF KOREA GINSENG DERIVED GINSEOL K-G1

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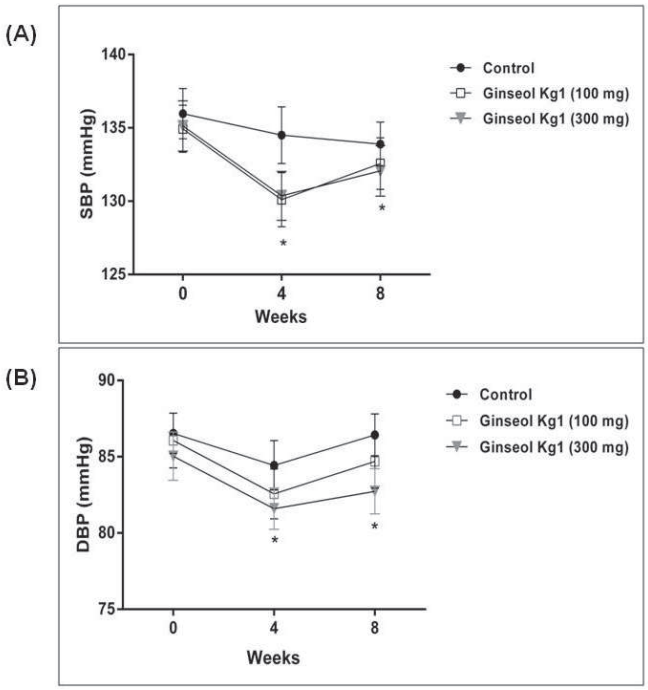
Objective: We investigated the effect of Panax ginseng extract, which is rich in the ginsenoside protopanaxatriol (Ginseol K-g1), on blood pressure (BP).

Design and method: Adults over 20 years old with a systolic BP (SBP) between 120-159 mm Hg or a diastolic BP (DBP) between 80-99 mm Hg were included. At the end of an initial 2-week washout period, the patients were divided into three groups: the control group (placebo), the low-dose Ginseol K-g1 group (100 mg), and the high-dose Ginseol K-g1 (300 mg) group. The primary end point was the difference in seated SBP (seSBP) and DBP (seDBP) changes between the placebo and Ginseol K-g1 groups after 8 weeks of treatment.

Results: A total of 90 subjects participated in the study (mean age; 55.2 ± 11.8 years, 43 males). At week 8, seSBP and seDBP were significantly decreased from baseline in the high-dose Ginseol K-g1 group (-3.1 mm Hg and -2.3 mm Hg, respectively, $p < 0.05$) . In contrast, there was no significant decrease in seSBP or seDBP in the control or low-dose Ginseol K-g1 groups.



No significant difference of seSBP and seDBP was identified among the three treatment groups at week 8. In patients who had an seSBP >= 130 mm Hg or an seDBP >= 85 mm Hg, the high dose of Ginseol K-g1 decreased the BP compared with the control group at week 4; however, there was no significant difference at week 8. The proportions of patients who experienced adverse events were comparable among the treatment groups.

Conclusions: Ginseol K-g1 has a favorable effect on BP after 4 weeks of treatment, especially at a high dose. However, the effect is not maintained over 8 weeks.

PP.23.18 METABOLIC RISK FACTORS MORE THAN OFFICE BLOOD PRESSURE EXPLAIN CHANGE IN PULSE WAVE VELOCITY BOTH IN FEMALES AND MALES

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Objective: To clarify the difference between males and females in change in carotid-femoral (C-F) and carotid-radial (C-R) pulse wave velocity(PWV) between two measurements performed in an interval of 2.5(0.9) years in treated hypertensive patients.

Design and method: A Doppler ultrasonography device (Micro Medical PulseTrace) was used to measure C-F and C-RPWV in 81 treated hypertensive patients (63.3(8.2) years, 42 females, 39 males). The mean of systolic(SBP) and diastolic(DBP) blood pressure measured three times during the visit was used. Plasma glucose, GHbA1c, lipids and urine albumin/creatinine were measured.

Results: BP in females was 139.0(16.1)/85.8(7.6) during first measurement (FM) and 137.1(14.6)/84.0 (7.6) during second measurement (SM), in males 139.9(17.7)/85.1(8.1) and 135.7(13.1)/ 84.1 (8.0) mmHg. The mean C-FPWV in females was 9.3(2.3) and C-R 10.5(1.3) during FM and 10.4(3.2) and 11.5(2.6) during SM, in males 11.6(3.7) and 11.4(3.1) and 12.0(2.6) and 13.1(3.7) m/s. C-FPWV in females increased 0.6(3.1) and C-R 1.0 (2.1), in males 0.6 (3.1) and 2.1 (4.0) m/s between the two measurements.
C-FPWV change was explained in females by change in glucose, LDL-cholesterol and triglycerides and by waist-hip ratio (WHR) and HDL-cholesterol, in males by change in glucose and hypercholesterolemia at FM. C-RPWV change in females by weight at FM, in males by type 2 diabetes (DM) at FM.
C-FPWV at SM was explained in females by change in DBP and SBP at FM, in males by WHR at FM. C-RPWV at SM was explained in females by change in SBP, DBP and glucose, in males by type 2 DM at FM. C-FPWV at measurement time (only parameters at the measurement time) was explained in females by SBP and DM, in males by glucose, GHbA1c and weight. C-RPWV was explained in females by age, weight, SBP and glucose, in males by GHbA1c and SBP.

Conclusions: The change in PWV was explained by metabolic factors including. In females also office blood pressure predicted PWV after 1-4 years. Otherwise it seems that office blood pressure explains PWV at measurement time and measurement time BP should be excluded when evaluating the change in PWV.

PP.23.19 PATIENT'S COMPLIANCE TO TREATMENT WITH PERINDOPRIL/AMLODIPINE FIXED DOSE COMBINATION. A PANHELLENIC PROSPECTIVE NON-INTERVENTIONAL STUDY

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Objective: Arterial hypertension represents a major public health problem. Regardless of the availability of effective therapies, hypertension remains poorly controlled. Complexity of multidrug regimens, under appreciation of the long-term risks associated with hypertension, as well as lack of compliance and adherence to treatment represent probably the main reasons.
Purpose: To record patients' compliance, to identify comorbidities and co-existing risk factors, as well as calculate the total cardiovascular risk in patients on Perindopril/Amlodipine fixed dose combination. To study effectiveness in blood pressure control during a 6-month treatment with this fixed combination.

Design and method: In this multicenter, non-interventional study, 2.300 patients were prospectively studied from 230 private cabinets, coordinated by 3 Cardiology departments. Physicians were dispersed in the entire Greek geographical territory, distributed in urban, suburban or rural areas, mimicking available epidemiological patterns of Greece. The data were recorded at baseline, 3 and 6 months. Patients included were >18 years old, with essential hypertension, under treatment with Perindopril/Amlodipine fixed dose combination. In all patients comorbidities and coexisting risk factors were recorded and total cardiovascular risk was calculated. Compliance to treatment was evaluated using a 5 score scale, at the 2nd and 3rd Visit.

Results: From 2.300 hypertensive patients who participated in the study, 52 patients (2.3% of the sample) prematurely discontinued treatment. Approximately 73.1% of patients were of "Moderate" or "High/Very high added risk". Mean SBP values decreased from 157.0 mmHg (1st Visit), to 129.0 mmHg (3rd Visit) ($p<0.001$). Mean DBP values decreased from 91.5 mmHg (1st Visit), to 78.8 mmHg (3rd Visit) ($p<0.001$). Patients with higher SBP and DBP values on the 1st Visit showed greater SBP and DBP decrease respectively ($p<0.001$). Compliance to treatment was high: 97.1% of the sample was taking their treatment "every day" or "quite often" during the study. In 1.927 patients (83.9% of the sample) was administered constant dosage of Perindopril/Amlodipine fixed dose combination during the whole study, while in 51.3% of the patients, was administrated the lower dose (5/5 mg).

Conclusions: Perindopril/Amlodipine fixed dose combination significantly and promptly reduces blood pressure levels, with high compliance to treatment.

PP.23.20 EFFECTIVENESS OF PERINDOPRIL/AMLODIPINE FIXED DOSE COMBINATION. A PANHELLENIC PROSPECTIVE NON-INTERVENTIONAL STUDY

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Objective: Arterial hypertension represents a major public health problem. Prevention, early detection and treatment are crucial. Regardless of the availability of effective therapies, hypertension remains poorly controlled. Drug regiment used, as well as compliance and adherence to treatment represent probably the main reasons.
Purpose:To study the effectiveness of Perindopril/Amlodipine fixed dose combination on blood pressure control during a 6-month period treatment in hypertensive patients. To record patient's compliance, and to identify comorbidities and co-existing risk factors, as well as calculate the total cardiovascular risk of patients.

Design and method: In this multicenter, non-interventional study, 2.300 patients were prospectively studied from 230 private cabinets, coordinated by 3 Cardiology departments of Greek Hospitals. Those physicians were dispersed in the entire Greek geographical territory, distributed in urban, suburban or rural areas, mimicking available epidemiological patterns of Greece. The data were recorded at baseline, 3 and 6 months. Patients recruited were >18 years old, with essential hypertension, under treatment with Perindopril/Amlodipine fixed dose combination. In all patients comorbidities and coexisting risk factors were recorded, and total cardiovascular risk was calculated.

Results: From 2.300 hypertensive patients included in the study, 52 patients (2.3% of the sample) prematurely discontinued treatment. Approximately 73.1% of patients were of "Moderate" or "High/Very high added risk". Mean SBP values decreased from 157.0 mmHg (1st Visit), to 134.0 mmHg (2nd Visit) and 129.0 mmHg (3rd Visit) ($p<0.001$). Mean DBP values decreased from 91.5 mmHg (1st Visit), to 81.6 mmHg (2nd Visit) and 78.8 mmHg (3rd Visit) ($p<0.001$).The mean SBP and DBP differences between the 1st and the 3rd Visit, varied among cardiovascular risk stratification. Patients with higher cardiovascular risk showed greater SBP and DBP decrease ($p<0.001$). Compliance to treatment was high. 97.1% of the sample was taking their treatment "every day" or "quite often" during the study.

Conclusions: Perindopril/Amlodipine fixed dose combination reaches blood pressure target promptly. The blood pressure control is maintained during a 6 month treatment. The degree of blood pressure reduction depends from baseline total cardiovascular risk.

PP.23.21 BLOOD PRESSURE LOWERING EFFECT OF FIMASARTAN IN POSTMENOPAUSAL WOMEN WITH HYPERTENSION

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Objective: Age-related increase in blood pressure (BP) is more rapid in women than men after menopause. Although the activation of renin-angiotensin system is suggested as one possible mechanism of postmenopausal hypertension, calcium channel blockers are still recommended as a first line anti-hypertensive in old women. This study aimed to investigate BP lowering effect of fimasartan, a new angiotensin receptor blocker, in postmenopausal women with hypertension.

Design and method: Between October 2011 and October 2012, Kanarb Metabolic Study recruited 10,515 hypertensive patients treated with fimasartan at a daily dose of 30~120 mg in Korea (700 private clinics and 11 university hospitals). Among them, 3,062 women with 3 months follow-up data including home BP monitoring were selected in this study. They were divided into two groups; premenopausal women (preMPW; n=783, 46.2±5.9 years) and postmenopausal women (postMPW; n=2,279, 61.3±8.1 years).

Results: Baseline systolic BP (preMPW; 143.8±18.5 vs. postMPW; 143.6±17.5 mmHg) was not different, but diastolic BP was lower (preMPW; 90.5±11.2 vs. postMPW; 86.7±10.7 mmHg; $p<0.001$) and pulse pressure was higher (preMPW; 53.3±12.7 vs. postMPW; 56.9±12.8 mmHg; $p<0.001$) in postMPW. After 3 months, systolic BP declined effectively in both groups (preMPW; -17.6±19.2 vs. postMPW; -16.7±19.0 mmHg; $p=0.282$). Diastolic BP much more decreased in preMPW (preMPW; -10.0±11.9 vs. postMPW; -8.4±14.4 mmHg; $p<0.001$), but 3-mon diastolic BP was still lower in postMPW. Home systolic BP was not different in both morning and night. Home diastolic BP of postMPW was lower in both morning (preMPW; 83.5±30.1 vs. postMPW; 80.5±20.3 mmHg; $p=0.005$) and night (preMPW; 82.6±28.9 vs. postMPW; 79.0±16.1 mmHg; $p<0.001$). After 3 months, home systolic BP showed a similar decline in both morning (preMPW; -6.3±11.8 vs. postMPW; -6.1±11.9 mmHg) and night (preMPW; -6.2±12.2 vs. postMPW; -5.8±12.2 mmHg). Home diastolic BP after 3 months were lower in postMPW, although the decrease was greater in preMPW in the morning (preMPW; -3.8±7.1 vs. postMPW; -3.0±6.5 mmHg; $p=0.01$) and at night (preMPW; -3.6±7.4 vs. postMPW; -2.7±6.8 mmHg; $p=0.009$).

Conclusions: Fimasartan lowered both clinic BP and home BP effectively in postmenopausal women as well as in premenopausal women with hypertension.

	PreMPW (n=783)		PostMPW (n=2,279)	
	Baseline	After 3 months	Baseline	After 3 months
Clinic SBP (mmHg)	143.8±18.5	126.2±13.4	143.6±17.5	126.9±13.0
Clinic DBP (mmHg)	90.5±11.2	80.5±9.2	86.7±10.7*	78.3±8.7*
Clinic PP (mmHg)	53.3±12.7	45.7±9.1	56.9±12.8*	48.6±9.9*
Home SBP				
Morning (mmHg)	135.6±39.5	129.0±43.7	136.1±23.1	131.2±51.2
Night (mmHg)	136.4±36.5	130.9±54.7	135.6±25.0	130.4±54.4
Home DBP				
Morning (mmHg)	83.5±30.1	79.8±29.7	80.5±20.3*	77.0±27.2
Night (mmHg)	82.6±28.9	81.0±46.5	79.0±16.1*	76.1±29.3*

* $p<0.01$ vs. preMPW
DBP, diastolic BP, MPW, menopausal women, PP, pulse pressure, SBP, systolic BP

PP.23.22 RESEARCH ON THE BIOEQUIVALENCE OF LEVAMLODIPINE TABLETS AND AMLODIPINE TABLETS

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Objective: To research the pharmacokinetics and bioequivalence of Levamlodipine Besylate Tablets in a healthy human body.

Design and method: Make 20 healthy volunteers to take a single dose of oral Levamlodipine Besylate Tablets or Amlodipine Besylate Tablets in a randomized crossover manner, then, take blood sample, adopt LC-MS-MS method to determine the drug concentration in the blood plasma.

Results: After 20 healthy male volunteers take a single dose of 2.5mg oral tested preparations of Levamlodipine Besylate Tablets (Shihuida) and 5mg oral referenced preparations of Amlodipine Besylate Tablets (Norvasc). The terminal phase elimination half life (t1/2), mean residue time (MRT), maximum concentration (Cmax), maximum time (tmax), AUC 0~t, AUC0~∞; of the drug concentration-time curve of S-(-)-Amlodipine in the body are 46.51±7.70 h and 42.77±8.08 h, 71.11±6.89 h and 69.25±8.04 h, 3.07±0.51 ng/mL and 3.06±0.51 ng/mL, 6.5±0.9 h and 6.3±1.0 h, 161.86±11.51 ng.h/mL and 176.20±31.89 ng.h/mL, 184.59±15.76 ng.h/mL and 197.92±37.54 ng.h/mL, respectively. The bioavailability of tested preparations of Levamlodipine Besylate Tablets is 94.07%±13.97% compared with the referenced preparations of Amlodipine Besylate Tablets (67.84%~116.64%).

Conclusions: 2.5mg tested preparations of Levamlodipine Besylate Tablets are bioequivalent with 5mg referenced preparations of Amlodipine Besylate Tablets.

PP.23.23 PERINDOPRIL ERBUMINE, AMLODIPINE, OR PERINDOPRIL ARGININE + AMLODIPINE FOR HYPERTENSION

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Objective: Perindopril and amlodipine have demonstrated significant cardiovascular benefits in randomized clinical trials, alone or in combination (e.g., in the Anglo-Scandinavian Cardiac Outcomes Trial). The erbumine salt of perindopril is hydroscopic, and therefore available in much of the world only in costly or inconvenient foil packaging. We therefore studied a more chemically stable salt, perindopril arginine, in combination with amlodipine, which can be successfully formulated as loose tablets.

Design and method: A three-arm, prospective, 59-center randomized clinical trial enrolled 837 subjects, of whom 820 were included in the intention-to-treat analysis. For 42 days, hypertensive subjects (average age 52±10 years [mean±standard deviation], 52% male, 34% black, 20% diabetic, baseline seated blood pressure of 158±12/101±5 mm Hg) received once-daily: amlodipine 10 mg (n=275), perindopril erbumine 16 mg (the US maximum marketed dose equivalent to 20 mg arginine salt, n=274), or amlodipine 10 mg + perindopril arginine 14 mg (n=271).

Results: The decreases in seated blood pressures (vs. baseline), according to intent-to-treat analyses, were: 13.7/9.5 vs. 19.3/13.2 vs. 23.7/15.7 mm Hg, $P < 0.001$, for perindopril, amlodipine, or the combination, respectively. Goal blood pressure (< 140/90 mm Hg, or < 130/80 mm Hg in diabetics, in accordance with US JNC 7 guidelines) was achieved at 42 days in 26%, 37%, and 51% of the subjects, respectively ($P < 0.001$) Treatment-emergent adverse effects were reported in 28%, 39%, and 31%, respectively ($P < 0.02$), largely driven by incident pedal edema in 0%, 13%, and 7%, respectively ($P < 0.001$). No subjects died, and there were no significant differences across randomized groups for: early discontinuation of therapy, rates of serious adverse events, serum potassium levels, or estimated glomerular filtration rates.

Conclusions: These data suggest that the combination of perindopril arginine + amlodipine reduces blood pressure significantly more than either twice the dose of perindopril erbumine or the same dose of amlodipine, with significantly less pedal edema than the same dose of amlodipine monotherapy.

PP.23.24 A STANDARDIZED TREATMENT APPROACH COMBINED WITH MEDICATION ADHERENCE MONITORING NORMALIZES BLOOD PRESSURE IN 53% OF 17 REFRACTORY HYPERTENSIVES

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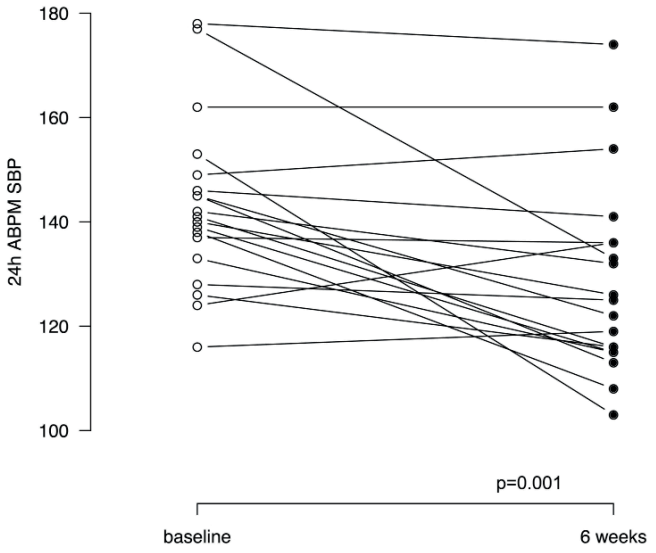
Objective: Low medication adherence and physician inertia are believed to be two principal causes for treatment-resistant hypertension. We have previously shown that electronic monitoring of medication adherence is associated with significant improvements of blood pressure. The objective of this study was to determine the prevalence of truly resistant hypertension after 6 weeks of a standardized triple anti-hypertensive regimen combined with electronic monitoring of treatment adherence.

Design and method: Patients referred for resistant hypertension to one of the three tertiary hypertension excellence centers could be included into the prospective, open-label, clinical trial. The anti-hypertensive therapy at referral was stopped in all patients and replaced by olmesartan (40mg), amlodipine (10mg), and chlorthalidone (25/50mg). Beta-blockers were continued if required for a non anti-hypertensive indication. All study medications were administered using a medication event monitoring system (MEMS®) to assess the proportion of prescribed doses taken. BP was assessed by 24h ambulatory blood pressure measurement (ABPM) at baseline and 6 weeks.

Results: Nineteen patients were included in the study. The mean age was 56 years and 37% were female. Fifteen patients were of European, two of African, and two of Asian / Middle Eastern origin. 53% / 39% of patients had a maternal / paternal history of hypertension. An average of 4 anti-hypertensive drugs was used. Average baseline office SBP/DBP values were 160/95±21/15 mmHg. Two of the 19 patients had normal 24h ABPM levels (<135/85mmHg).
After 6 weeks of standardized treatment regimen using MEMS, 9 of 17 patients (53%) normalized the 24h ABPM (average 24h BP drop 17/12±16/10 mmHg; p=0.001 for both SBP and DBP) – see Figure.



Conclusions: A treatment protocol of adequately dosed long-acting anti-hypertensive drugs combined with adherence monitoring is yielding large treatment effects in more than half of patients referred for resistant hypertension to three tertiary hypertension centers. The impact of this therapeutic approach needs to be confirmed in a larger trial and the long-term impact needs to be quantified. If favorable effects are confirmed, such an approach may represent an efficient treatment option for treatment-resistant hypertension.

PP.23.25 BLOOD PRESSURE REDUCTION IS ASSOCIATED WITH IMPROVED METABOLIC STATUS IN FIMASARTAN TREATED HYPERTENSIVE PATIENTS

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Objective: The metabolic syndrome (MetS) closely linked to insulin resistance which has been known to have causality with development of hypertension. This study was for evaluation of the relationship between home and/or office BP reduction and improvement of metabolic component in hypertensive subjects treated with fimasartan included antihypertensive agents.

Design and method: Among the K-MetS study population (nation-wide prospective observational study including primary care clinic to tertiary care hospital, antihypertensive treatment including fimasartan), total 6,780 subjects were available in 3-month follow up period. (mean age 56.2±10.65 years, 51.86% male). Home BP monitoring (HBPM) was performed in baseline and 3-month follow up period in addition to office BP measurement (OBPM).
The subjects were divided into 4 groups according to the results of BP monitoring on baseline and 3-month follow up period. Group 1; achieved target BP (<140 / 90mmHg) only on OBPM. Group 2; achieved target BP (<135 / 85mmHg) only on HBPM (average of morning and evening value). Group 3; both achieved target BP. Group 4; both did not achieved target BP. These groups were compared in baseline and 3-month follow up value of metabolic components.

Results: The prevalence of MetS was 54.16% in baseline and was 55.84% in 3-month follow up period. The results of OBPM and HBPM showed significantly reduced BP values during 3-month fimasartan treatment (Table 1). The subjects in group 3 consistently showed significantly lower obesity index and triglyceride level compared with other groups at baseline and 3 month follow up period (Table 2.) There were significant relationship between systolic / diastolic BP and obesity index especially in group 3 subjects (r=0.2, P<0.01). For the group 4 subjects at baseline who moved to group 3 at 3-month follow up period, significantly improved obesity index was noted (Table 3).

Table 1. Comparison of Blood Pressure

Office Blood Pressure

	Basline	3 month	difference	P value
SBP	144.36±17.17	127.86±13.00	-16.50±18.48	<0.0001
DBP	88.57±11.32	79.58±9.19	-8.99±11.70	<0.0001

Home Blood Pressure

		Basline	3 month-FU	difference	P value
Ave. (Morning and Evening)	SBP	136.47±25.49	130.74±38.72	-5.69±38.82	<0.0001
	DBP	81.39±9.97	74.66±8.40	-3.11±22.74	<0.0001

Table 2. Comparison of Metabolic Components Among 4 Groups at Baseline and 3-month Follow up

	N	baseline	F	Pr>F	N	3 month follow up	F	Pr>F
Triglyceride, mg/dl (mean±SD)								
group1	673	139.89±116.11	12.67	<.000	704	162.28±110.10	14.55	<.000
group2	1309	164.46±116.83			363	172.96±127.04		
group3	1103	150.54±96.18			1823	154.69±102.05		
group4	2291	175.93±125.53			364	195.94±149.95		
Waist, cm (mean±SD)								
group1	691	85.98±9.11	8.25	<.000	808	85.88±8.57	13.57	<.000
group2	1349	86.72±9.17			375	87.23±8.74		
group3	1128	85.50±8.56			1835	85.37±8.55		
group4	2400	87.01±9.09			357	88.22±9.45		
Weight, kg (mean±SD)								
Group1	694	66.38±11.25	14.01	<.000	931	67.09±11.42	23.48	<.000
Group2	1361	67.53±11.51			436	68.16±11.51		
Group3	1130	65.62±10.54			2115	65.55±10.51		
Group4	2411	68.12±11.67			433	70.05±12.81		
BMI, kg/m^2 (mean±SD)								
group1	694	25.07±3.07	4.30	0.005	931	25.12±3.14	16.86	<.000
group2	1360	25.31±3.22			436	25.66±3.44		
group3	1130	25.13±3.17			2114	24.91±3.04		
group4	2411	25.47±3.25			433	25.95±3.58		

Table 3. Comparison of Obesity Index Between Subjects of Group 4 at Baseline who Moved to Group 3 in 3-mo FU vs. Others

Variables		N	Mean	Std Dev	t Value	Pr > F
waist	a	577	-0.300	3.301	0.14	0.8848
	b	1724	-0.324	3.458		
wt	a	580	-0.449	2.077	-0.99	0.32
	b	1731	-0.350	2.070		
BMI	a	580	-0.170	0.797	-1.06	0.2878
	b	1731	-0.130	0.795		

"a"= group 4 at baseline and moved to group 3 in 3-month follow up period
* "b" = other subjects
*waist, wt, BMI differences= 3month F/U – Baseline

Conclusions: Even though the prevalence of MetS was not changed during 3-month fimasartan treatment, appropriately controlled blood pressure is associated with improved metabolic components, especially obesity index. These results suggest that the plausible main antihypertensive effect of fimasartan is associated with improved insulin resistant.

PP.23.26 REVERSE EFFECT OF L-AMLODIPINE ON MICROALBUMINURIA IN PATIENTS WITH POORLY-CONTROLLED BLOOD PRESSURE

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Objective: To observe the reverse effect of different combined regimens on blood pressure and microalbuminuria(MAU) in hypertensive patients.

Design and method: Ninety-four hypertensive patients with blood pressure>140/90 mmHg (1 mmHg=0.133 kPa) and positive MAU after treatment with inhibitors of angiotensin invertase and antagonists of angiotensin Π receptor were included in this study. The patients were randomly divided into L-amlodipine group (n=52) and diuretics (HCTZ) group (n=42). After the patients were treated with L-amlodipine(2.5-5 mg/d) and HCTZ(12.5-25mg/d) respectively for 12 weeks,the reverse effect of different regimens on blood pressure and MAU was observed.

Results: The normal blood pressure was achieved in 35(67.3%)and 27 patients(64.3%) respectively(P>0.05),the negative MAU rate was 53.8% and 19.0% respectively (P<0.01),the blood pressure was<140/90 mmHg and the MAU was>=30% in 80.8% and 64.3% of the patients in the two groups 12 weeks after treatment(P<0.05).

Conclusions: The effect of renin and angiotensin blocking agents in combination with calcium antagonists or HCTZ is similar to that of other regimens on blood pressure and other parameters, and is better than that of renin and angiotensin blocking agents in combination with HCTZ.

PP.23.27 GLYCERYL TRINITRATE FOR ACUTE STROKE: MAIN RESULTS FROM THE EFFICACY OF NITRIC OXIDE IN STROKE (ENOS) TRIAL

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Objective: High blood pressure (BP) is common during the acute phase of stroke and is associated with a poor outcome. Although small and medium-sized trials have assessed the effect of altering BP on outcome, the management of high BP remains unclear. We tested whether transdermal glyceryl trinitrate (GTN), a nitric oxide that lowers BP, is safe and effective in improving outcome after acute stroke.

Design and method: ENOS is an international multicentre prospective randomised single-blind blinded-endpoint trial. Patients with acute ischaemic stroke (IS) or intracerebral haemorrhage (ICH) and systolic BP 140-220 mmHg were randomised to GTN or no GTN (and, where relevant, to continue or stop pre-stroke antihypertensive therapy - results reported separately). The primary outcome is shift in modified Rankin Scale at 3 months. Patients or relatives gave written informed (proxy) consent and all sites had research ethics approval. Analysis is by intention-to-treat.

Results: 4,011 patients were enrolled from 173 sites in 23 countries across 5

continents between July 2001 and October 2013 (with 79% patients recruited from start of 2008).
At baseline: mean age 70 (SD 12); male 57%; recruitment from Asia 14%, Europe 16%, UK 64%; prior hypertension 65%; prior stroke 15%; diabetes 17%; atrial fibrillation 17%; mean BP 167 (19)/90 (13) mmHg; severity (Scandinavian Stroke Scale) 34 (13)/58; total anterior circulation syndrome 30%; IS 81%, ICH 16%; stroke-recruitment time <12 hours 18%.

Conclusions: The main results will be available for presentation in quarter 2 2014. ENOS is large enough to influence clinical practice.

PP.23.28 CONTINUE OR STOP PRE-STROKE ANTIHYPERTENSIVE THERAPY IN ACUTE STROKE: MAIN RESULTS FROM THE EFFICACY OF NITRIC OXIDE IN STROKE (ENOS) TRIAL

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Objective: A majority of patients are taking antihypertensive medication before their stroke. However the management of such treatment(s) remains unclear and is the subject of the ENOS trial.

Design and method: ENOS is an international multicentre prospective randomised open-label blinded-endpoint trial. Patients with acute ischaemic stroke (IS) or intracerebral haemorrhage (ICH), systolic BP 140-220 mmHg, and taking antihypertensive therapy immediately before their stroke were randomised to continue or stop this for 7 days; all patients were also randomised to transdermal glyceryl trinitrate (GTN) or no GTN (single-blind, results reported separately). The primary outcome is shift in modified Rankin Scale at 3 months. Patients or relatives gave written informed consent and all sites had research ethics approval. Analysis is by intention-to-treat.

Results: 2,097 patients were enrolled from 152 sites in 23 countries across 5 continents between July 2001 and October 2013 (with 82% patients recruited from start of 2007). At baseline: age 73 (SD 11); male 51%; recruitment from Asia 10%, Europe 19%, UK 65%; number of BP drugs before stroke, 1: 44%, 2: 35%, 3: 16%, 4: 4%, >4: 1% (median 2); angiotensin modifier 64%, beta-blocker 39%, calcium channel blocker 35%, diuretic 35%, alpha-blocker 7%,; prior stroke 20%; diabetes 23%; atrial fibrillation 22%; mean BP 167 (19)/88 (13) mmHg; severity (Scandinavian Stroke Scale) 33 (13)/58; total anterior circulation syndrome 33%; IS 85%, ICH 12%; median time to recruitment 26 (IQR 20) hours.

Conclusions: The main results will be available for presentation in quarter 2 2014. ENOS is large enough to influence clinical practice.

PP.23.29 EFFECT OF NEBIVOLOL IN CONTRAST INDUCED NEPHROPATHY PREVENTION AMONG RISKY INDIVIDUALS

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Objective: Mechanisms responsible for CIN(contrast induced nephropathy) include vasoconstriction due to decreased nitric oxide(NO) and oxidative stress. Nebivolol is a new-generation beta blocker with anti-oxidant properties cause vasodilation via NO release so it is expected that nebivolol may prevent CIN. Few studies showed beneficial effects of nebivolol on CIN but they used serum Cr as a marker of renal damage but in our study we used serum neutrophil gelatinase associated lipocalin (NGAL) level which is more sensitive marker of renal injury.

Design and method: Patients who have predefined risk factors for CIN development (diabetes mellitus[DM], advanced age, reduced GFR, anemia) and have indications for elective coronary angiography(CAG) were included to study. 54 patients who were using nebivolol and 52 patients who were not using nebivolol. All patients were hydrated with 0.9% NaCl and iohexol was used during coronary angiography. CIN was defined as a rise in SCr of 0,5 mg/dl or a 25% increase from the baseline value, within 48h after the CAG. Serum Cr, eGFR and NGAL levels assessed before and 48 hour after CAG. Mehran risk scores were calculated for both groups.

Table 1: Baseline demographic characteristics of the Nebivolol (+) and Nebivolol (-) groups.

	Nebivolol (+) n= 54 mean±SD or %	Nebivolol(-) n= 52 mean±SD or %	P value
Age (years)	68,5±9,0	64,6±13,5	0,22
Sex (M/F) *	22/32	28/24	0,17
DM*	%35	%38	1
HT*	%66	%46	0,32
CAD*	%33	%26	0,73
Baseline Cr (mg/dL)	1,08±0,38	0,98±0,31	0,36
Baseline GFR (ml/min/m2)	68,5±23,4	81,3±23,4	0,07
Current medication*			
ACE inhibitor	%40	%36	1
ARB	%22	%26	1
CCB	%25	%15	0,48
ASA	%77	%78	1
Statins	%51	%52	1

* Chi-square, others Student's t test. ARB:Angiotensin Receptor Blocker, CCB: Calcium Channel Blocker, ASA: Acetylsalicylicacid

Table 2: Laboratory and clinical comparison between the Nebivolol (+) and Nebivolol (-) groups.

	Nebivolol (+) mean±SD or %	Nebivolol (-) mean±SD or %	p
Mehran risk score	7,3±2,5	5,9±2,8	0,06
Amount of contrast medium	90,5±38,4	102,2±50,8	0,34
Duration of Nebivolol treatment (day)	36,4±18,3	27,7±17,1	0,02
Clinical CIN	%6,8	%12,5	0,6
Level of Cr (mg/dl) prior to CAG	1,08±0,38	0,98±0,31	0,36
GFR(ml/dl/m2) prior to CAG	68,5±23,4	81,3±23,4	0,07
Cr (mg/dl) following CAG	1,10±0,38	1,01±0,36	0,48
GFR (ml/dl/m2) following CAG	67,2±22,3	80,7±25,2	0,06
NGAL (ng/ml) prior to CAG	2,64±1,08	2,49±0,98	0,59
NGAL (ng/ml) following CAG	4,03±2,35	3,55±2,11	0,46

Student's t test was used.

Table 3: NGAL values before and after Coronary Angiography

Nebivolol (+)	Before CAG mean±SD	After CAG mean±SD	p
Cr (mg/dl)	1,08±0,38	1,10±0,38	0,6
GFR(ml/min/m2)	68,5±23,4	67,2±22,3	0,37
NGAL (ng/ml)	2,64±1,08	4,03±2,35	0,004
Nebivolol (-)	**Before CAG mean±SD**	**After CAG mean±SD**	
Cr (mg/dl)	0,98±0,31	1,01±0,36	0,15
GFR(ml/min/m2)	81,3±23,4	80,7±25,2	0,38
NGAL (ng/ml)	2,49±0,98	3,55±2,11	0,02

Paired sample t test was used

Results: Both groups were similar in terms of age, sex, comorbid conditions, current medications (Table1) Duration of Nebivolol treatment and Nebivolol dose was 5 mg/day for all patients. Mehran scores, amount of contrast medium used, mean level of NGAL and GFR values before and after CAG were similar in both groups (P>0,05)(Table2). CIN developed 6,8% in the Nebivolol(+) group and 12,5% in the Nebivolol(-) group(P=0,6). No significant reduction occurred in post-CAG GFR values in both groups. NGAL levels in both groups increased significantly compared to baseline(from 2,64±1,08 to 4,03±2,35 in the Nebivolol(+) group p=0,004 and from 2,49±0,98 to 3,55±2,11 in the Nebivolol(-) group;P=0,02) (Table 3 on the previous page).

Conclusions: Although nebivolol seems to be beneficial for CIN prevention, In our study we found no significant beneficial effect of nebivolol in CIN.

PP.23.30 PREVALENCE AND TREATMENT STATUS OF ARTERIAL HYPERTENSION IN DIFFERENT REGIONS OF GEORGIA

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Objective: Recently special attention was paid on the right management of hypertension (HTN) in the country. A lot of patients even in the city hospitals are not aware on their HTN and haven't right management. Aim of the study was to evaluate prevalence of HTN in the country side of Georgia, its awareness and treatment status.

Design and method: During the summer time group of doctors visited Khelvachauri with 80m elevation, Sighnaghi with 800m elevation, Ananuri with 900m elevation and Shatili – 1400m elevation from the sea level. 420 patients (mean age 57.2±14.7 years) from Khelvachauri, 242 patients (mean age 55.8±13.4 years) from Sighnaghi, 236 (mean age 61.2±15.4 years) from Ananuri and 110 (mean age 43.6±14.2 years) from Shatili were examined. Blood pressure measurement was performed according the guidelines.

Results: Hypertension prevalence among the examined patients was 85.2% in Khelvachauri, 64% in Sighnaghi, 63% in Ananuri and 36% in Shatili. Awareness of having hypertension was the lowest in Khelvachauri (81% vs 92% in Sighnaghi, 94% in Ananuri and 95% in Shatili). 59.2% of patients from Khelvachauri were on antihypertensive treatment mostly with short acting antihypertensive medications, which are not recommended for HTN management. 83% of Sighnaghi patients were on antihypertensive treatment; therefore only 57% of hypertensives were on a treatment with recommended antihypertensive medications. 77% of examined hypertensives in Ananuri were on a treatment; therefore, only 43% had right management of HTN. 30% of examined hypertensive individuals in Shatili were on a regular, recommended antihypertensive treatment, while other 55% of hypertensives used only short acting antihypertensive medications for symptomatic lowering of blood pressure. Control rate was the highst in Sighnaghi (17%) and the lowest in Khelvachauri, where practically none of the patients had controlled HTN. Control rate of HTN in Ananuri was 9% and 8% in Shatili.

Conclusions: Taking into account the study data from different parts of Georgia we confirm the necessity of improvement of treatment, control and management strategies of arterial hypertension in the country. Country side of Georgia still is far from the recommended management principles of hypertension.

PP.23.31 PREVALENCE OF HYPERTENSION CONTROL DEPENDS ON GUIDELINES

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Objective: To determine how blood pressure (BP) targets according different guidelines, change the prevalence of hypertension (HTN) control.

Design and method: We selected a sample of 127 patients attending a HTN consultation in a public hospital. We collected data on demographic variables, cardiometabolic diseases and antihypertensive drugs. According to the European Guidelines, HTN was considered controlled when the diastolic BP (DBP) was < 90mmHg and the systolic (SBP) <140mmHg in patients with 80 years old or less and <150mmHg in those with more than 80 years old. According to JNC8 guidelines, the systolic and diastolic BP targets are the same as European Guidelines, but the former has an age cut-off of 60 years old. The Student t test was used for analyzing continuous variables and the chi-square for categorical variables. A P<0.05 was considered significant. Statistical analysis was performed using SPSS.

Results: Fifty two (40.9%) and 62 patients (48.8%) fulfilled control criteria using the European Guidelines and JNC8, respectively. Ten patients (7.9%) exhibited controlled BP regarding the JNC8 definition but not with the European Guidelines; they were older (67.0 ± 6.1 vs. 57.4 ± 15.0 years, P=0.048), and although not significant, these patients were more often men (12.3% vs. 4.3%, P=0.092), diabetic (14.7% vs. 5.4%, P=0.092), had a greater body mass index (31.9 ± 4.3 vs. 30.3 ± 5.1, P=0.346) and were using more antihypertensive drugs (3.4 ± 1.2 vs. 2.9 ± 1.1) as more drug combinations (9.9% vs. 2.8%). No sort of tendency was found for dyslipidemia, cerebrovascular, coronary and kidney disease and heart failure.

Conclusions: Adopting the BP targets of JNC8 guidelines we will classify as controlled some patients that were not considered controlled by the European Guidelines, as well as the former JNC7. As identified by some members of the JNC8 committee, this could reduce the treatment intensity, which could affect essentially high risk patients. As this small study states, we might not need to intensify treatment in diabetic and older patients and we could also de-escalate treatment in some patients, if we consider them controlled by the JNC8 goals.

PP.23.32 COMPLIANCE WITH THE EUROPEAN GUIDELINES FOR PATIENTS WITH ARTERIAL HYPERTENSION

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Objective: Arterial hypertension is the major cause of cardiovascular morbidity and mortality. The majority of the hypertensive patients have one or more cardiovascular risk cofactors such as diabetes, smoking, obesity and pre-existing heart or renal disease. Many indices (anthropometric, biochemical) and echo-markers have been established for the assessment of the prognosis and cardiovascular risk stratification of the hypertensive patients.The study aims to assess the compliance of the therapists with the Guidelines on hypertension of the European Society as also the knowledge and the level of awareness among hypertensive patients.

Design and method: We enrolled 270 consecutive patients (128 male, 142 female) with essential hypertension, aged 57.7±11.9 years. In all patients, blood pressure levels (office and ambulatory blood pressure) the glycemic (fasting glucose and HbA1c levels) and the lipidemic profile, as well as renal function (GFR) and target organ damage was assessed. The statistical analysis was performed using the Students t-test or the non-parametric Mann-Whitney test for the comparison of two quantitative means and the non-parametric Kruskal-Wallis test for the comparison of more than two quantitative means.

Results: Only a small fraction of patients achieved the therapeutic goals, according to recommendations based on the Guidelines of the European Society. Only 27% of hypertensive patients, 62% of diabetics and 41.5% of dyslipidaemics achieved therapeutic targets as expressed by the Guidelines of the European Society. In patients with more than one risk factor the % of goal achievement was further decreased. Only 12.3% of patients with diabetes and hypertension, 11% of patients with Hypertension and dyslipidemia and 6% of the patients with Hypertension, diabetes and dyslipidemia achieved the therapeutic goals, according to recommendations based on the Guidelines of the European Society.

Conclusions: Guidelines are available to improve the management of arterial hypertension. However gaps exist between recommendations and clinical practice. Barriers responsible for poor compliance with current guidelines include scepticism and lack of familiarity with the recommendations as far as the doctors and medical consultants are concerned and underestimation of the risk on behalf of the patients.

PP.23.33 DOCTORS' VIEWS ON HYPERTENSION CARE IN AN ACADEMIC PRIMARY CARE CENTRE: A QUALITATIVE STUDY

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Objective: Hypertension is one of the chronic diseases commonly managed in primary care. Despite having a national clinical practice guideline (CPG) on hypertension in Malaysia since 1998 only 26% of hypertensive patients treated with medication had achieved target blood pressure. One main reason for this is doctors' poor adherence to CPG. We thus embarked on a study to explore primary care doctors' views on hypertension care and use of CPGs in the local setting. This is the exploratory phase of a bigger study to develop an intervention to improve the quality of care among hypertensive patients.

Design and method: We used a qualitative methodology and conducted focus group discussions (FGDs) among doctors in the Primary Care Clinic of University of Malaya Medical Centre in 2013. Purposive sampling was used to select doctors based on their clinical experience. An interview topic guide was developed based on literature review. The FGDs were audio-recorded and transcribed verbatim. Two researchers analysed the data independently using the framework analysis approach.

Results: A total of 19 doctors participated in four FGDs. The participants felt that hypertension care was appropriate and their patients were more informed about hypertension in the clinic. They were aware of the CPGs, which have improved their knowledge on hypertension. However, the challenge lies in the implementation of the CPGs. Confusion occurred when the doctors followed the CPGs guidelines while the specialists had their own way of managing hypertension. Provision of hypertension care varied according to the doctors' clinical experience. The participants attributed poor blood pressure control to patients' co-morbidities, non-compliance to treatment and their own therapeutic inertia.

Conclusions: This study highlighted a mismatch between current state of blood pressure control and doctors' views on the care they provide for their patients with hypertension. A more effective approach to implementing CPGs in primary care is needed urgently.

PP.23.34 RECOMMENDED THERAPY FOR HEART FAILURE TREATMENT. GAP BETWEEN GUIDELINESS AND CLINICAL PRACTICE

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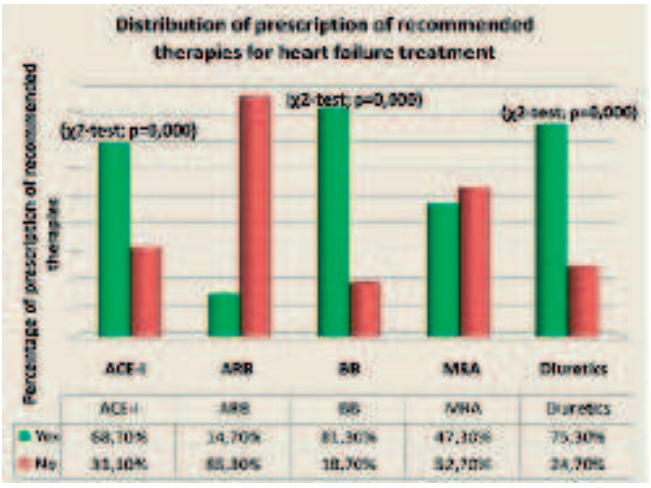
Objective: Heart failure teatment has progressed considerably over past decades. Large studies made angiotensin converting enzyme inhibitors, beta-blockers, diuretics, aldosterone inhibitors and angiotensin-receptor blockers as highly recommended for heart failure treatment. Guidelines should have an important impact on the management in daily clinical care, however, the uptake of guidelines into clinical practice is slow and number of patients receiving recommended therapies is still far from optimal. Aim was to investigate prescription prevalence for recommended groups of medicines in patients with moderate heart failure.

Design and method: This prospective research included 150 patients with moderate heart failure of ischemic etiology, treated in Clinic of Cardiology, University Clinical Center Kragujevac from June 2010-June 2011. We used therapeutic lists and medical reports for collection of data for usage and doses of recommended medicines. All data were stored in a specially designed database, and statistically analyzed in the SPSS for Windows.

Results: Among 150 patients, 76 (50.7%) were female and 74 (49.3%) were male, with the mean age of 72.66±8.45 years. NYHA II class was present in 79 patients (52.7%), and NYHA III in 71 patient (47.3%). Only 12.6% reached target dose for ACE-inhibitors and only 4.9% for beta-blockers. A combination of ACE-inhibitors and beta-blockers was prescribed in 88 patients (85.4%). Both, ACE-inhibitors and beta-blockers had negative correlation to age with higly significance for ACE-inhibitors (Pearson's coeficient -0.176; p=0.031).



Conclusions: Although ACE-inhibitors and beta-blockers are highly recommended even in mild to moderate heart failure, and the rate of their usage is higher, they are still not prescribed enough. Reaching of target doses is very low probably due to a degree of heart failure. In contrast to previous researches, we demonstrated that age represented no limitation in prescription of these medicines which somehow represents a progress in management.

PP.23.35 NURSES INVOLVEMENT IN HYPERTENSION GUIDELINES DISSEMINATION

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Objective: In Canada, nurses are actively involved in the multidisciplinary efforts to control high blood pressure whether they work in hospitals, in the clinic or in the community. Their involvement can be at all stages of management of hypertension. Screening and follow up through proper blood pressure measurement and teaching of home blood pressure measurements are good examples of simple steps that can truly make a difference. Nurses are also actively implicated in guidelines development and knowledge transfer activities. In Canada, they have been closely involved in developing different tools (video, DVD, poster, e-learning sessions, pamphlet, and teaching booklet) to promote evidence-based care for patients. The objective to this presentation is to share with other professionals the different initiatives developed and implemented.

Design and method: The development process comprises steps including literature review, needs assessment, learners' and context analysis and creation of an expert panel. Pilot projects with patients included in the target audience and professionals that would use the educational tool are also performed once the different tools are validated.

Results: Example of implementation and impact evaluation concerning office blood pressure measurement and home blood pressure measurement will be discussed.

Conclusions: Educational material has to be properly planned, developed and validated in order to induce behavior changes.
All stakeholders who represent different point of views have to be identified early in the process and include at every step.Nurses and nurse practitioners are ideally suited for chronic disease management; their proximity with patients provides them an exceptional access to continuously educate them and their families on the progress and benefits of optimum treatment of hypertension. Guidelines development and dissemination are other areas in which nurses car contribute to enhance care for patients and their families.

PP.23.36 DRUG PRESCRIBING FOR HYPERTENSION AT PRIMARY HEALTHCARE DISTRICT IN SAUDI ARABIA

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Objective: To describe the drug prescribing pattern for hypertension in a primary health care district in Qatif.

Design and method: A descriptive, cross-sectional survey was conducted in 27 primary healthcare centers across Qatif District using a de novo, pilot-tested data collection sheets during Jan 2013.

Results: A total of 899 hypertensive patients were recruited into the study. The prevalence of diabetes mellitus and smoking was (56.3%) and (17.7%), respectively. Information on the current drug prescribed was available for all patients and 64 of these patients (7.1%) were managed without drug intervention. On average, patients were prescribed 1.76 antihypertensive drugs. Angiotensin converting enzyme inhibitors (ACEI), particularly Lisinopril and captopril, were the most commonly prescribed class of antihypertensive drugs in 63.1% of patients. thiazide diuretics, calcium channel blockers, beta-blockers and angiotensin receptor blockers were prescribed in 52.1%, 30.6%, 29%, and 1.7% of patients respectively. ACEI were more likely prescribed in diabetic patients ($p < .001$), while thiazide diuretics and beta-blockers were more in non-diabetic patients ($p < .001$). Combining two classes of antihypertensive drugs or more was noted in 59.3% of the sample.

Conclusions: There was significant use of ACE inhibitors, thiazide diuretics, calcium channel blockers and beta-blockers. ACEI, as monotherapy or in combination with other drug classes, were more likely prescribed in diabetic hypertensive patients. Thiazide diuretics were used as frequently as expected. The observed prescribing pattern in Qatif primary health care setting seems to point to an attempt to follow international and regional guidelines for the management of hypertension.

PP.23.37 IMPLEMENTATION OF HYPERTENSIVE TREATMENT RECOMMENDATIONS IN HUNGARY. FIRST FINDINGS FROM THE SUBGROUP ANALYSIS OF THE STROKE COHORT OF THE HERCULES TRIAL

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Objective: Hypertension is one of the major controllable risk factor of stroke and cardiovascular morbidity/mortality. Stroke is principal cause of death in Europe: accounting for 1.1 million deaths each year. One in seven women and one in ten men died from the disease in 2012. Treatment efficacy is highly dependent on the extent to which treatment guidelines are followed in daily clinical practice (ESC/ESH 2013).

Design and method: We conducted a noninterventional observational study HERCULES (Hungarian hypERtensive patients' treatment in line with CUrrent therapeutical guideLinE Study) to obtain cross-sectional data on the ex-

tent to which Hungarian physicians take treatment recommendations into account. This subgroup analysis was designed to investigate the stroke cohort. During a period of 7 months (March-Sept 2011), we recorded the clinical data of 51 846 patients, in 1000 practices, who were either newly diagnosed with HT or whose HT was uncontrolled. Total of 3422 patients make up the stroke cohort. Their demographic data, BP, heart rate, previous treatment, and treatment modifications were recorded.

Results: This subgroup analysis included 3422 stroke patients (males 49%; females 51%; average age 68.4±10.4 years). Occurrence of the main risk factors, comorbidities were significantly higher compared to the main population: obesity +2.0%, dyslipidemia +14.9%, DM +8.3%, IHD +18.8%, PAD +9.2%, smoking +2.1%, CKD +4.0%. Only 2.42% of patients were newly diagnosed HT, but in 97.58% BP was uncontrolled. Physicians administered statins (81%), ASA (59%), clopidogrel (36%), antidiabetics (22%), and modified the antihypertensive treatment in 95% of the patients as follows:

Monotherapy or part of free combination	N° of patients on previous therapy (%)	N° of stroke patients on previous therapy (%)	N° of patients on modified therapy (%)	N° of stroke patients on modified therapy (%)
ACE inhibitor	10727 (42.5%)	1700 (49.7%)	9620 (10.0%)	1120 (8.6%)
β-blocker	20541 (44.3%)	1528 (44.7%)	19575 (42.2%)	1014 (29.6%)
CCB	7791 (15.8%)	706 (23.3%)	4149 (9.0%)	375 (11.0%)
ARB	3485 (7.5%)	309 (9.0%)	2583 (5.5%)	184 (5.4%)
Thiazide diuretic	3382 (7.3%)	402 (11.7%)	951 (1.9%)	131 (3.8%)
Thiazide-like diuretic	1628 (3.5%)	182 (5.3%)	1382 (3.0%)	137 (4.0%)
Fixed-dose combinations				
ACE inhibitor + HCTZ	5030 (10.9%)	494 (14.4%)	2600 (5.6%)	199 (5.8%)
ACE inhibitor +indapamide	2061 (4.4%)	227 (6.6%)	15800 (30.3%)	1428 (41.8%)
ACE inhibitor + CCB	1765 (3.8%)	181 (5.3%)	10947 (92.8%)	1752 (51.2%)
ARB + HCTZ	1291 (2.8%)	120 (3.5%)	2628 (5.7%)	172 (5.1%)
ARB + CCB	513 (1.1%)	44 (1.3%)	1790 (3.8%)	143 (4.2%)

Conclusions: HERCULES is the largest trial in Hungary evaluated the implementation of hypertension treatment guidelines, with special emphasis on the occurrence of comorbidities, in this analysis on stroke. It is especially positive that in this vulnerable population, physicians were considerably more likely to choose more advanced fixed-dose combinations - following the actual recommendations - such as ACE-inhibitor+indapamide and ACE-inhibitor+CCB (41.8% and 51.2%, respectively), on top of the appropriate administration of statins, ASA and clopidogrel. It seems that the main messages have reached the physicians, but a reminder may be necessary from time to time.

PP.23.38 WHAT ROLE DOES AFRICAN ANCESTRY PLAY AND HOW HYPERTENSIVE PATIENTS RESPOND TO CERTAIN ANTIHYPERTENSIVE DRUG THERAPY?

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Objective: This is a summary of the response of four commonly used antihypertensive agents in African ancestry patients.

Table – Antihypertensive agents in white and black communities.

Agent	White	Black
Thiazide	+	++
Rauwolfia	+	+
β-blockers	+	+/-
β-blockers + thiazides	+	+
α and β-blockers	+	+
Methyldopa	+	+
Vasodilators	+	+
ACE inhibitors	+	+/-
ACE inhibitors and thiazides	+	+
Calcium channel blockers	+	+
Angiotensin II antagonists	+	+/-

Design and method: We reviewed 3763 articles and 72 reports that consisted mainly of the four major classes of antihypertensive drugs, calcium channel blocker (CCB) and thiazide-like diuretics or indapamide, drugs that block the renin-angiotensin system and β-adrenergic blockers.

Results: Response was superior in African ancestry patients on a thiazide-like diuretic or indapamide or CCB. The response to β-adrenergic blockers and angiotensin-converting enzyme inhibitors (ACEI) are attenuated. (Table) Pharmacokinetics, plasma renin and genetic polymorphisms did not well predict the response of patients of African ancestry to antihypertensive drugs. An emerging view that low nitric oxide and creatine kinase may explain individual response is very limited. African ancestry seems to be the best predictor of individual responses to antihypertensive drugs.

Conclusions: Clinicians are encouraged to take an individualised approach. Patients of African ancestry as a group respond better when treating hypertension to CCB and a thiazide-like diuretic or indapamide, while the response to a β-adrenergic blocker or ACEI is attenuated. This pertains to monotherapy in patients of African ancestry. As yet there is no ideal antihypertensive agent which may be used in patients of African ancestry. In addition, ACEI or β-adrenergic blockers produce the same antihypertensive effect as CCB if it is combined with a thiazide-like diuretic or indapamide. We should be aware of the special African ancestry when initiating treatment with monotherapy. Guidelines for the treatment of patients of African ancestry have recognised this important fact. It is probable that with the concept of prescribing polytherapy ab initio a two drug combination should the BP be > 20/10 mm Hg above treatment goals should obviate the problem. A thiazide-like drug if it has not been in the individual patient as a first line drug is a useful combination with either a β-adrenergic blocker or an ACEI or angiotensin receptor blocker.

PP.23.39 HOW FAR IS PRACTICE FROM RECOMMENDATIONS IN HYPERTENSION? AN ELECTRONIC SURVEY OF PRACTICE PATTERNS IN COLOMBIAN INTERNISTS

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Objective: To evaluate the "clinical distance" between current practice in hypertension and recommendations from a guideline among Colombian internists.

Design and method: Prior to development of an evidence-based, ministry of health-backed hypertension guideline, we conducted an electronic survey among members of the Colombian Association of Internal Medicine with registered email addresses. The guideline covered 23 clinical questions, with 26 recommendations divided into 4 modules (prevention, diagnosis, treatment and patient follow up). Our survey had 15 multiple-choice questions covering all 26 recommendations, each with four possible clinical decisions. Interested doctors received (by strata of years after graduation and practice setting) a computer-generated email with a random sample of questions assessing recommendations on one of the modules of the guideline. We categorized answers by "clinical distance" (as accurate/close or distant) from recommendations. Respondents were unaware of the recommendations in the guideline before filling our survey.

Results: From a potential registry of 541 functional email addresses, there were 132 (24.4%) respondents, with roughly an even distribution across levels of work experience and level of care, with half working with outpatients, 35% in hospital care and 12% in emergency wards. In total, responders provided 522 answers (ranging 31-36 for each of the 15 questions). The overall median of answers considered accurate/close to recommendations was 63% (75% for questions on prevention; 63% for diagnosis; 64% for treatment and 16% for patient follow up), ranging 14%-100% for each of the 15 questions. Six of the 15 questions (on emphasizing lifestyle changes, estimating overall risk, use of vascular ultrasound to stratify risk, prescribing initial monotherapy, ordering renal function studies and recording family history of hypertension) had at least 75% accurate/close answers. In contrast, four questions had less than 30% (regarding thiazides as a first –line therapy, routine fundoscopy, requesting 24-hour BP monitoring or routine EKG, and use of drug combinations) accurate/close answers.

Conclusions: The distance between recommendations and practice in hypertension varies widely among Colombian internists. Distance was higher for questions regarding patient follow up. Stratifying practice patterns may help implementation and future adherence.

PP.23.40 ANTHROPOMETRIC AND METABOLIC FEATURES OF ELDERLY HYPERTENSIVE PATIENTS ACCORDING TO THE NEW ESH/ESC GUIDELINE BLOOD PRESSURE TARGETS

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Objective: The 2013 ESH/ESC guidelines for the management of arterial hypertension has revised the recommendations for blood pressure treatment in the elderly. The aim of this analysis was to evaluate the main anthropometric and metabolic characteristics of male hypertensive subjects older than 65 yrs participating in the Olivetti Heart Study (OHS), according to the previous and the new blood pressure levels proposed by the ESH/ESC guidelines.

Design and method: Among OHS participants (n=994) 184 were older than 65 yrs. One hundred forty six of them had hypertension based on the new ESH/ESC guidelines. Using the new cut-offs, two groups of patients were identified: the first one included all individuals with a systolic blood pressure (SBP) less than 140 mmHg (group 1), while the second one was made by individuals with SBP between 140 and 150 mmHg (group 2). In order to explore if these different SBP cut-offs were able to identify also a different pattern of cardiometabolic risk, we evaluated the differences between these two groups in the main anthropometric and cardiometabolic factors.

Results: Forty-one participants were included in group 1 and 54 in group 2. Diastolic and pulse pressure were significantly higher in group 2 ($p<0.05$) than in group 1. The number of antihypertensive drugs assumed per day was greater for group 1 ($p<0.001$). No statistically significant differences were found between the two groups with regard to anthropometric and metabolic variables. However, the participants in group 1 showed a higher BMI, waist circumference and HOMA index compared to those in group 2. Using the SCORE cardiovascular risk score algorithm, group 2 participants had a higher CV risk compared with group 1 (respectively 11.1 vs 8.7; $p<0.05$)

Conclusions: Tight SBP control in elderly patients was associated with a greater number of antihypertensive pills assumed per day. A less tight SBP control was associated with higher diastolic and pulse pressure and with higher cardiovascular risk, using the SCORE algorithm. The group with tight BP control showed a trend to a worse metabolic and anthropometric profile, however the difference was not statistically significant.

PP.23.41 COMPARISON OF THE TOTAL COST OF ESSENTIAL HYPERTENSION (EH) ON OUTPATIENT AND HOSPITAL STAGES

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Objective: The purpose of this study is to estimate the total cost of the hypertension treatment on outpatient and hospital stages.

Design and method: 498 outpatients and 525 hospital history cards of EH patients were retrospectively selected for analysis. To calculate the total cost of illness direct (DC) and indirect costs (IC) were summarized.

Results: Summary DC on treatment EH patients were 5447,45 ± 4029,21 rub. per year in the outpatient stage and 7702,79 ± 2438,06 rub. per year in hospital. Major DC on drugs was 84% in ambulatory. Major DC in the structure of hospital were 83% and for cost of 1 hospital day. Average cost of not given social product is 632.46 in the ambulatory, the cost of certificates of incapacity of work- 408.34; common IC - 1040.8 rub. / per person in year. These findings in the hospital were 2211.19, 1427.63 and 3638.82 rub. per 1 patient with EH respectively. Average total cost of outpatient EH treatment is the sum of DC and IC. It was 6488.25 rub. per 1 patient in year, in hospital it was 11,341.61 rubles. per 1 patient.

Conclusions: 1. The total cost of treatment EH patients in the hospital for a few days is higher in 2 times than it one on outpatient stage for 1 patient per year.
2. Direct costs is the major part of the cost structure (84% - in the outpatient stage, and 67.9% - in the hospital).
3. Improvement of effective EH treatment will significantly reduce the number of hospitalizations and reduce the number of bed-days, by that reducing expenses.

PP.23.42 UTILITIES RELATED TO HYPERTENSION AND ITS ASSOCIATED COMORBIDITIES AMONG SOUTH KOREANS

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Objective: Utilities are cardinal values that represent an individual's preference for specific health outcomes. These values are used in cost–utility analyses of pharmaceuticals and other healthcare interventions. Hypertension (HTN) is a significant disease burden worldwide due to its prevalence and role as a risk factor of cardiovascular disease. As the population ages, the number of individuals with chronic diseases will also increase. However, previous studies in South Korea have only focused on the utilities related to patients with HTN without considering its associated comorbidities. The present study investigated the utilities related to HTN and its associated comorbidities among South Koreans.

Design and method: The Korea National Health and Nutrition Examination Survey (KNHANES) 2007-2011 data were used for this study. Of the 31,712 adults (aged 19 years and above) in this dataset, 5,428 patients were included after excluding those with missing variables. Utility was measured using the EuroQol (EQ-5D), and HTN-associated comorbidities included coronary heart disease (CHD), stroke, and diabetes (DM). Of the 5,428 patients with HTN, 1,621 (29.0%) had HTN-associated comorbidities: 219 patients with CHD, 241 patients reported having a stroke, and 930 patients with DM.

Results: The overall utility index of hypertensive patients was higher among adults (19-64 years) than the elderly (aged 65 years and above). Patients with HTN-associated comorbidities had lower EQ-5D scores than those with HTN alone (0.93 for adults and 0.83 for elderly). Patients with HTN who reported having a stroke (0.86 for adults and 0.74 for elderly) showed the lowest utility index value among the comorbid groups. Patients with HTN-associated comorbidities were more likely to have 'some' or 'severe' problems with regards to all EQ-5D domains (i.e., mobility, self-care, usual activity, pain/discomfort, and anxiety/depression) compared with patients with HTN alone.

Conclusions: Patients with HTN and HTN-associated comorbidities had significantly lower utility indices compared with patients with HTN alone. Therapeutic approaches should focus more on the subjective perceptions of health among patients with HTN and HTN-comorbidities.

PP.23.43 FIXED-DOSE COMBINATIONS OF ANTIHYPERTENSIVE DRUGS IN GREECE: SELECTION RANGE AND PROJECTED PRICE DIFFERENCE

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Objective: Recent ESH/ESC guidelines favour the use of combinations of two antihypertensive drugs at fixed doses in a single tablet, because reducing the number of pills to be taken daily improves adherence and increases the rate of blood pressure control. The aim of the study was to identify the selection range of fixed-dose combinations (FDC) in Greece and to recognize the projected difference in prices.

Design and method: We searched the current Corrigendum Price Bulletin of Medicines for Human Use issued by the Ministry of Health at 30-08-2013 in order to locate the approved FDCs, their prices and the prices of the separate drugs, either generics or original brands.

Results: There are 31 FDCs available: 1 direct renin inhibitor with hydrochlorothiazide (HCT), 9 ACE inhibitors (ACEI) with diuretics (mainly HCT), 7 angiotensin receptor blockers (ARB) with HCT, 3 beta-blockers (BB) with diuretics (mainly HCT), 5 calcium antagonists (CA) with ACEIs, 3 CAs with ARBs, 1 CA with BB, 2 ARBs with a CA (amlodipine) and HCT (triple combinations). There are in total 74 different concentrations, 18 of which are merchandised in both generics and original brands (the generic FDCs are in total 25,3% cheaper than the original FDCs), 3 only in generics and the rest 53 are marketed under original brands. It is possible to "reconstruct" each one of the 74 FDC concentrations by using the analogous drugs in original brands which would lead to a mean 6,1% added cost. On the other hand, if we use generics we can "reconstruct" 48 different FDC concentrations with a mean 27,6% reduction in cost. Surprisingly, 24 FDCs' concentrations can only be "reconstructed" if we use at least one original brand drug, a "reconstruction that would lead to a mean 19,5% raise of cost.

Conclusions: There is an adequate range of FDCs marketed in Greece. The use of generics, either as generic FDCs or as free-dose generic drugs to "reconstruct" the FDCs, could result in approximately a 25% reduction in cost.

POSTERS' SESSION

POSTERS' SESSION PS24
HAEMODYNAMICS

PP.24.01 IMPAIRED HEMODYNAMIC AND RENAL RESPONSES TO PROLONGED ORTHOSTATIC STRESS IN OBESE PATIENTS

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Objective: Obesity is associated with an increased risk of developing hypertension. However the mechanisms involved in the pathogenesis of obesity-related hypertension are unclear. The objective of the study was to compare the hemodynamic, neuro-hormonal and renal response to orthostatic stress in healthy controls (HC) and obese participants (OB).

Design and method: This was a single center prospective study. Participants' characteristics, leptin and adiponectin were measured at baseline. Blood pressure (BP), heart rate, plasma renin activity (PRA), plasma aldosterone, norepinephrine (NE), urinary electrolytes and creatinine excretion were measured at baseline and after one hour of orthostatic stress induced by lower body negative pressure (LBNP). Response within or between groups were compared using paired or unpaired t-test, or the Wilcoxon rank-sum test.

Results: 48 participants were included in this study, 25 in the HC group and 23 OB group. Mean age was 33 years (range 19-55) in HC and 41 years (range 23-60) in OB (p = NS). BMI was 22.0±2.2 in HC and 34.7±4.6 kg/m2 in OC (p<0.05). Hemodynamic, renal and neuro-hormonal variables are shown in the table 1.

Table 1: hemodynamic, renal and neuro-hormonal response to LBNP in HC and OB

	HC		OB	
	Baseline	LBNP	Baseline	LBNP
Systolic BP (mmHg)	110±9	113±10*	128±15¶	134±19*
Diastolic BP (mmHg)	64±8	69±7*	77±11¶	84±13*
Heart rate (bpm)	63±8	61±8	65±7	68±9*
Creatinine clearance (ml/min)	140 (122;150)	125 (111;130)*	148 (130;175)	151 (133;168)
Sodium excretion (µmol/min)	236±78	213±192*	234±113	214±149
NE (nM)	1.14 (0.92;1.37)	1.46 (1.17-2.1)*	1.03 (0.76-1.46)	1.54 (1.07-1.82)*
PRA (ng/ml/min)	0.35 (0.3;0.5)	0.5 (0.25-0.8)*	0.5 (0.08-0.6)	0.5 (0.2-1.0)*
Aldosterone (pg/ml)	28.5 (21.0;50.9)	29.5 (20.8-56.1)	39.8 (18.0-57.2)	42.4 (27.3-51.8)

Data are means ± SD or medians and interquartile range. HC: healthy control, OB:obese, LBNP: Lower Body Negative pressure, BP: blood pressure, NE: norepinephrine, PRA: plasma renin activity. * P<0.05 vs baseline, ¶ P<0.05 vs HC

At baseline, systolic and diastolic BP and leptin were significantly higher in OB than in HC (p<0.05). Adiponectin was lower in OB (p<0.05). LBNP increased BP, NE and PRA in both groups. LBNP decreased creatinine clearance and sodium excretion in HC only and increased heart rate in OB only. Changes in heart rate (-1.7±7.5% vs 4.5±8.1%, p<0.05 and creatinine clearance (-14.6±13.8% vs 3.08±16.9%, p<0.05) were different between HC and OB. Waist to hip ratio was associated with LBNP-induced changes in heart rate (r:0.34, p<0.05), creatinine clearance (r:0.37, p<0.05), and NE (r:0.34, p<0.05). Leptin (r:0.36, p<0.05) and adiponectin (r:-0.28, p=0.05) were associated with changes in creatinine clearance.

Conclusions: These results show an impaired renal response to stress in obese patients. In contrast to HC, OB patients maintain their sodium excretion and high creatinine clearance during LBNP at the expense of an increased baseline BP and increased heart rate response during LBNP. These findings suggest that the pressure natriuresis curve is shifted to the right in OB.

PP.24.02 SYSTEMIC AND RENAL CIRCULATORY RESPONSES TO PURINORECEPTOR STIMULATION WITH ADENOSINE DIPHOSPHATE ARE MODIFIED IN ANGII-INDUCED HYPERTENSION

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Objective: P2 purinergic receptors (P2R) were detected in the renal vasculature and tubules. Their expression is modified by hypertension, however, the impact on renal haemodynamics and function of P2Y-R, one of two P2R families, was studied mostly in isolated preparations. We showed in an earlier whole-kidney study in normotensive rats (NT) that nonselective activation of P2Y-R with adenosine diphosphate (ADP) increased renal haemodynamics but decreased excretion. Here, we explored, the effect of P2Y-R stimulation in rats rendered hypertensive (HT) by two-weeks' infusion of angiotensin II (AngII), at 80 ng/min, delivered by osmotic minipumps.

Design and method: In acute experiments adult male Sprague-Dawley rats, anaesthetized with sodium thiopental, 100 mg/kg i.p., effects of ADP on mean arterial pressure (MAP), heart rate (HR), renal haemodynamics and excretion were measured simultaneously. After control period, effects of three consecutive doses of ADP (2, 4, 8 mg/h/kg), followed by recovery period, were examined. The whole-kidney blood flow (RBF) was measured by Transonic probe on the left renal artery, the regional perfusion parameters were determined using laser-Doppler probes placed on the kidney surface (cortex) or inserted into the outer- (OMBF) and inner-medulla (IMBF). Urine flow, sodium, potassium and total solute excretion were also measured.

Results: The clear hypotensive effect of ADP was greater in HT than in NT group (-40 vs. -18 mmHg, p<0.01), By contrast, HR increased by 25 in HT and 50 beats/min in NT rats, p<0.001). RBF increased similarly in both groups (by 1 ml/min/g). ADP altered medullary perfusion (OMBF, IMBF) in HT rats only (+20±5%). Interestingly, haemodynamic responses lasted longer in NT rats and tended to recede during drug infusion in the HT group. ADP reduced renal excretion in NT and did not change it in HT rats.

Conclusions: In conclusion, AngII-induced hypertension appears to enhance vasodilatator P2Y-R mediated effects in the systemic circulation,and induce them in the renal medulla while abolishing P2Y-R effects on renal tubular transport. The transiency of haemodynamic ADP effects in hypertensive as compared with normotensive rats suggests that, sustained purinoreceptor mediated vascular actions are attenuated in AngII-induced hypertension model.

PP.24.03 HYPERTENSION-RELATED LEFT VENTRICULAR HYPERTROPHY IS ASSOCIATED WITH RIGHT VENTRICULAR DYSFUNCTION

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Objective: Left ventricular hypertrophy is a common echocardiographic finding of hypertensives. The functional interdependence of the two ventrincles often leads to right ventricular dysfunction. We assessed the hypothesis that Tissue Doppler Imaging (TDI) may help us study the subtle alterations of the right ventricular function in patients with hypertension-related left ventricular hypertrophy.

Design and method: We studied 55 subjects (aged=51±6 years, 44 men) with newly diagnosed, never treated, stage I-II essential hypertension and 34 age- and sex-adjusted control subjects. Standard transthoracic echocardiographic measurements as well as pulsed-wave tissue Doppler from tricuspid annulus were obtained.

Results: Age and heart rate were similar between the two groups. Hypertensives exhibited significantly increased left ventricular (LV) diastolic septal and posterior wall thickness, left atrial diameter, LV mass, LV mass index and relative wall thickness. Right ventricular TAPSE and RVOTfs (%) were similar between the two groups (2.45±0.3 vs 2.25±0.23 and 47±5 vs 46±5, respectively, p= NS for all). Conventional echo Doppler study revealed similar RV peak E, A velocities as well as their ratio between the two groups. At the level of lateral tricuspid annulus, all of the diastolic measurements were altered in hypertensives [early diastolic velocity (cm/sec) 13±4 vs 18±4, p<0.01, late diastolic velocity (cm/sec) 20±3 vs 14±4, p<0.01, early to late diastolic velocity ratio 20±4 vs 14±3, p<0.01]. Systolic velocity did not differentiate between the two groups (16±3 vs 17±3, p=NS).

Conclusions: Right ventricular functional alterations can be identified by TDI imaging in hypertensives with left ventricular hypertrophy. TDI imaging unmasks sublte changes in the diastolic function of the right ventricle.

PP.24.04 RELATIONSHIPS BETWEEN RENAL HAEMODYNAMICS WITH CARDIAC AND AORTIC HAEMODYNAMICS IN THE EARLY STAGES OF ESSENTIAL HYPERTENSION

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Objective: To evaluate the relationship of increased renal resistive index (RRI) with Augmentation index (AIx) and cardiac haemodynamics by means of mitral annular early diastolic velocity (E/Ea) in untreated patients with essential hypertension.

Design and method: 76 newly diagnosed untreated non diabetic patients with stage I–II essential hypertension [35 males, aged 50 years, office blood pressure (BP) = 143/ 91 mm Hg], underwent ABPM, complete echocardiographic study for determination of E/Ea and blood sampling for assessment of metabolic profile. Moreover, data on renal resistive index (RRI), obtained by Doppler ultrasound sampling of the intrarenal arteries, as well as augmentation index (AIx), were retrospectively analyzed.

Results: Based on the mean value of RRI (0.60), hypertensives were classified into those with high and low RRI. Hypertensives with high RRI values compared to those with low values were older (55.6±9.8 vs 44.4±11.6 years, $p < 0.001$), had lower 24-hour diastolic BP (77.5±7.7 vs 84.3±6.7 mmHg, $p < 0.001$), lower 24-hour HR (71.2±10.3 vs 76.2±9.2 bpm, $p < 0.05$), higher levels of AIx (27.2±8.2 vs 17.8±14.8 %, $p < 0.01$), and higher values of E/Ea (lateral) (7.7±1.8 vs 6.2±2.3, $p < 0.05$). In the total population, RRI was negatively related to 24-hour diastolic BP ($r = -0.523$, $p < 0.001$) and 24-hour HR ($r = -0.281$, $p < 0.05$), while it was positively associated with CRP ($r = 0.335$, $p < 0.05$), TChol ($r = 0.296$, $p < 0.01$), age ($r = 0.443$, $r < 0.001$), AIx ($r = 0.413$, $p = 0.001$) and E/Ea(lateral) ($r = 0.465$, $p < 0.05$). Multiple regression analysis revealed that 24-hour diastolic BP and E/Ea (lateral) were independent associated with RRI ($R2 = 0.434$, $p < 0.05$).

Conclusions: Increased vascular resistance of intrarenal arteries is associated with impaired aortic and cardiac haemodynamics, as reflected by increased AIx and E/Ea (lateral) values. RRI may be considered a useful surrogate of haemodynamics in essential hypertension.

PP.24.05 COMPARISON DATA OF TRANSTHORACIC DOPPLER ECHOCARDIOGRAPHY AND RIGHT HEART CATHETERIZATION IN PATIENTS WITH IDIOPATHIC PULMONARY ARTERIAL HYPERTENSION

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Objective: To estimate dynamics systolic and diastolic function of right and left ventricular, during acute pharmacological testing (APhT) with inhaled nitric oxide (iNO) in patients with idiopathic pulmonary arterial hypertension (IPAH).

Data during acute pharmacological testing.

Data	Responders before iNO n=18	Responders after iNO	p	Not responders before iNO n=22	Not responders after iNO	p
SPAP-1	69.7±13.9	49.5±9.1	0.000	110.4±27.0	104.8±26.4	0.001
SPAP-2	79.3±14.6	48.8±11.4	0.000	102.4±32.6	99.3±7.02	0.037
PVR, din*sec/sm^5	748.7+247.1	430.1+190.7	p<0.05	1738.5+657.4	1606.3+664.2	p<0.05
RVOT PLAX proximal diameter	3.19±0.66	3.2±0.7	p>0.05	3.98±0.82	4.0±0.8	p>0.05
FAC	41.1±5.6	39.5±6.98	0.635	27.9±14.4	28.9±15.1	0.644
S' at the annulus RV	5.9±1.3	7.1±1.5	0.000	4..3±1.3	4.3±1.4	0.825
E' at the annulus RV	*4.8±1.4	*6.5±1.5	0.000	*2.4±1.1	*2.6±1.2	0.474
E/E' ratio	7.0±5.9	5.7±4.6	0.545	28.3±20.1	23.5±17.7	0.196
S' at the annulus LV	4.5+1.2	4.9+1.3	0.001	3.7+1.1	3.6+0.8	0.339
E' at the annulus LV	*5.6±1.6	*6.9±1.3	0.000	*3.9±1.7	*3.9±1.5	0.954

SPAP-1- SPAP evaluated using ECHO, SPAP-2- SPAP evaluated using RHC. PVR- pulmonary vascular resistance evaluated by RHC. RVOT PLAX proximal diameter by ECHO [RVOT- right ventricular outflow tract; PLAX- parasternal long-axis].

Design and method: In the study we included 40 pts (35 females/5 males) with IPAH aged 21-55(mean age 38,8± 10,9years). Patients were performed noninvasive APhT with iNO (20ppm for 10min) controlled by ECHO, before two hours to RHC. The estimation of SPAP was performed initially at rest and then at 10min of nitric oxide inhalation. Later all pts were performed right heart catheterization (RHC) with APhT. Patients were divided into two groups: responders and not responders (18/22 pts respectively). ECHO included routing parameters and TVI mode was used to evaluate systolic and diastolic function of RV/LV before and after APhT. SPAP was calculated taking into account right atrial pressure. In all pts included in the study the degree of tricuspid regurgitation was II-III. Patients have got functional class II-IV (WHO).

Results: We found no significant dynamic of routine echo parameters during APhT. After 10 min of APhT with iNO there was a significant improvement indicators such as S', E' at the tricuspid and mitral lateral annulus of RV/LV. We found significant reduce of SPAP during APhT. We found a positive correlation in the evaluation SPAP using two methods: Transthoracic Doppler Echocardiography and RHC. We recieved the following correlation: responders- 0.8 before test and 0.66 after test; not responders- 0.96 before test and 0.94 after test respectively.

Conclusions: ECHO may be used for an accurate assessment of vasodilator response as compared to RHC data. During APht with iNO only S', E' at the lateral annulus of RV/LV may be used for detecting vasoreactive pts.

PP.24.06 COMPARATIVE ASSESSMENT OF CENTRAL HEMODYNAMIC PARAMETERS IN UNCOMPLICATED HYPERTENSION PATIENTS WITH DIFFERENT REST HEART RATE

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Objective: To compare central hemodynamic parameters assessed by applanation tonometry in uncomplicated hypertension patients with different rest heart rate.

Design and method: In 62 consecutively recruited treated and non-treated non-diabetic patients (57,5±3,5 year) with uncomplicated mild and moderate arterial hypertension (participants of PERFECT-BP prospective observational study, ISRCTN75706523) with sinus rhythm and resting heart rate (HR) of 55-86 bpm at baseline office brachial blood pressure (BP) measurement with Microlife BPW200 and pulse wave analysis (SphygmoCor) with assessment of aortic BP, augmentation pressure (AP) and augmentation index (AI) were performed. Patients were distributed in two groups: with HR>=70 bpm (group 1, n=33) and HR<70 bpm (group 2, n=29).

Results: Patients of groups 1 and 2 did not differ in age (56,1±4,2 vs 58,7±4,4 years), gender (men 48,5% vs 51,7%), body mass index (30,7±2,8 vs 31,2±2,8 kg/m2), systolic (147,7±11,4 vs 149,5±11,5 mm Hg) and diastolic (88,2±7,1 vs 90,2±7,5 mm Hg) brachial BP (all p>0,05). Applanation tonometry results and mean HR see in the Table.

Table. Applanation tonometry results and mean HR (M±m).

Group	HR, bpm	Aortic BP, mmHg			AI, %	AP, mmHg
		systolic	diastolic	pulse		
1	79,8±1,8	132,8±8,7	89,2±7,4	43,8±1,9	23±0,9	11±0,09
2	62,4±2,3	140,4±8,7#	90,9±8,3	48,5±1,9#	24±0,9	14±0,08*

- p<0,05, compared to group 1, * - p<0,01, compared to group 1.

Conclusions: In non-diabetic patients with uncomplicated mild/moderate arterial hypertension with similar age, sex and brachial BP resting HR <70 bpm, compared to HR>=70 bpm, is associated with higher aortic systolic and pulse BP and augmentation pressure.

PP.24.07 DIFFERENCES IN HEMODYNAMIC PARAMETERS IN DIPPERS AND NON-DIPPERS IN A DRUG NAÏVE HYPERTENSIVE POPULATION

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Objective: Non-dipping status is associated with increased cardiovascular disease. The aim of the present study was to investigate differences in the hemodynamics in hypertensive patients in regards to their dipping status.

Design and method: 51 drug naïve (female, n=35), newly diagnosed hypertensive patients were recruited. Patients underwent a 24-hour blood pressure measurement (Spacelabs 90216). Hemodynamics were assessed by impendance cardiography (ICG) by means of the Cardioscreen 2000 rheocardiographic system. ICG measured parameters were: Base impedance (Zo), Thoracic Fluid Content (TFC), Thoracic Fluid Content Index (TFCI), Stroke Volume (SV), Stroke Index (SI), Cardiac Output (CO) Cardiac Index (CI), Oxygen Delivery Index (DO2I), Velocity Index (VI), Acceleration Index (ACI), Heather Index (HI), Pre Ejection Period (PEP), Left Ventricular Ejection Time (LVET), Systolic Time Ratio (STR), Systolic Time Ratio Index (STRI), Ejection Time Index (ETI), Ejection Time Ratio (ETR), Left Cardiac Work (LCW), Left Cardiac Work Index (LCWI), Left Stroke Work Index (LSWI), Systemic Vascular Resistance (SVR), Systemic Vascular Resistance Index (SVRI), Stroke Systemic Vascular Resistance Index (SSVRI), Total Artery Compliance (TAC), Total Artery Compliance Index (TACI). All parameters analyzed had a normal distribution. Independent samples t-test was used to compare means of the two groups.

Results: Mean age of the population was 54.5±13.7 years. Total Artery Compliance (TAC) was higher in the dippers group, (mean±sd= 1.47±5.8 for non-dippers, vs 1.95±0.75 mL/m2 mmHg for dippers, p<0.05), same as TAC Index (TACI) (mean±sd= 0.78±0.26 for non-dippers, vs 1.04±0.38 mL/m2 mmHg for dippers, p<0.05).

Conclusions: Loss of arterial compliance is a major factor of the age-related development of hypertension and affects normal nocturnal dipping. Our results indicate that non dipping status might be associated with enhanced resistive vessels remodeling (afterload) rather than hyperdynamic circulation (preload).

PP.24.08 RENAL DENERVATION IMPROVES CENTRAL HEMODYNAMICS AND PULSE PRESSURE AMPLIFICATION IN PATIENTS WITH TREATMENT RESISTANT HYPERTENSION

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Objective: Renal denervation (RDN) was shown to be effective in reducing peripheral BP in treatment-resistant hypertension. Accumulating data suggest that central pressures may be a better predictor of cardiovascular events and outcomes than the corresponding peripheral pressure. PP amplification is among others inversely related to stiffer arteries and peripheral arterial resistance.

Design and method: Fifty-seven patients with treatment resistant hypertension (office BP >=140/90 mmHg, while on at least 3 antihypertensive agents, and diagnosis confirmed by 24-h ABPM >=130/80 mmHg) underwent catheter-based RDN using the Symplicity FlexTM catheter (Medtronic Inc., Palo Alto, CA). In addition in our lab pulse wave analysis was assessed before and after 6 months of RDN. PP amplification is determined as ratio of peripheral PP to central PP.

Results: Patients (59±12 years) were treated with 6.0±1.3 antihypertensive drugs on average. Peripheral as well as central systolic and diastolic BP were reduced (all p<0.01) 6 months after RDN. In accordance, peripheral PP (77.5±22 versus 71.5±23 mmHg, p=0.008) and central PP (63.2±21 versus 56.7±22 mmHg, p=0.001) were reduced 6 months after RDN. Consistently, there was a significant improvement in PP amplification (1.25±0.2 versus 1.30±0.2 mmHg, p=0.012). Also central augmentation pressure (20±12 versus 16±13 mmHg, p<0.001) and augmentation index (cAIx@75) (24±10 versus 21±11 %, p=0.005) decreased 6 months after RDN. There was no change on heart rate (63±11 versus 64±10 bpm, p=0.499).

Conclusions: Thus, our data suggest that RDN might exert beneficial effects indicated by an improvement of central PP beyond peripheral PP, and PP amplification.

PP.24.09 HYPERTENSION IN ADULT PATIENTS WITH CONGENITAL HEART DISEASE

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Objective: Based on advance of surgical procedure and medical therapy, most patients with congenital heart disease can be expected to survive into adulthood today. It means that the patients are faced with problems associated with hypertension. It is assumed that hypertension is a burden on a surgically repaired heart. Therefore, we examined the risk factors for the hypertension in adult patients with congenital heart disease.

Design and method: We evaluated brachial blood pressure in 101 adult patients with congenital heart diseases (37.2 ± 15.0 years, male/female 65/36) and compared many risk factors (demographic characteristics, biochemical data, radial pressure augmentation and brachial-ankle pulse wave velocity) between hypertensive and normotensive patients.

Results: Sixteen patients were diagnosed as hypertension based on guidelines for the management of hypertension 2009 by Japanese Society of Hypertension. Fourteen patients demonstrated high blood pressure and other patients were administrated antihypertensive drugs. Univariate analysis demonstrated that there is a significant correlation between hypertension and age (51.1±16.7 v.s. 33.6±12.5 years, p=0.003), body mass index (24.4±4.1 v.s. 22.1±4.3, p=0.041), cyanosis (0/16 v.s. 17/85, p=0.04), low density lipoprotein cholesterol (119.8±33.6 v.s.97.1±31.1 mg/dl, p=0.008), total cholesterol(201.3±41.6 v.s.167.4±36.2mg/dl, p=0.028), reflected blood pressure on radial artery (133.6±22.3 v.s. 100.3±13.9 mmHg, p<0.0001), and brachial-ankle pulse wave velocity (1628±416 v.s.1150±258cm/s, p<0.0001). Logistic regression analysis proved a significant relationship between hypertension and reflected blood pressure on radial artery (odds ratio 1.117(1.058-1.179), p<0.0001).

Conclusions: The enhanced aortic pressure wave reflection is one of the risk factors for hypertension in adult patients with congenital heart disease. It is reported that the pressure wave reflection is augmented in some postoperative condition (ex. aortic coarctation repair, arterial switch operation, etc.). Careful observation and early therapeutic intervention are needed in follow-up of the patients.

PP.24.10 HIGH BLOOD PRESSURE AND ARTERIOGRAPHY VARIABLES

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Objective: To assess the relationship between high blood pressure values and endothelial dysfunction, arterial stiffness, arterial age, coronary blood flow and ejection duration.

Design and method: A total of 195 patients (35 with high normal blood pressure and hypertension), aged 29±9 years, 37% male, underwent arteriography. Linear and multiple regression analysis were performed to assess the relationship between elevated blood pressure values (systolic blood pressure: SBP, diastolic blood pressure: DBP, systolic blood pressure in the aorta: SBPAo) and arteriography parameters.

Results: SBP was: 122±14 mmHg, DBP: 72±11 mmHg, SBPAo: 110±14 mmHg, pulse wave velocity (PWV): 7.52±1.54 m/s, brachial augmentation index (Aix Brach): -53±22%, aortic augmentation index (Aix Ao): 11±1.09%, arterial age: 35±17 years, diastolic reflection area (DRA): 60±18, diastolic area index: 52±5%, ejection duration (ED): 294±21 ms. Linear and multiple regression analysis revealed significant associations between high blood pressure values and impaired coronary perfusion (DRA < 50 and DAI < 50%), arterial stiffness (PWV > 9.7 m/s), endothelial dysfunction (Aix Brach < -10%), arterial age and ejection duration.

Conclusions: High normal blood pressure and hypertension impair endothelial function and coronary perfusion, increase ejection duration and arterial age.

PP.24.11 CHANGES IN HEMODYNAMIC STATUS IN PATIENTS WITH NYHA II AND III HEART FAILURE DURING HOSPITALIZATION

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Objective: Hemodynamic status can be assessed by simple parameters, such as blood pressure level, with its pulsatile and steady components, and also using heart rate and left ventricle ejection fraction that influence mainly on pulsatile component. Aim was to estimate the hemodynamic status and the changes during hospitalization.

Design and method: Research included 150 patients (74-male; 76-female) with moderate heart failure (NYHA II/III) of ischemic etiology, treated in our clinic from June 2010-June 2011. Blood pressure was measured after 5 minutes of rest in a supine position. Pulsatile component, estimated by PP, was defined as

arithmetic difference between SBP and DBP, and steady component by MAP, calculated using the formula [(2*diastolic)+systolic]/3. Echocardiography was used to assess the percent of LVEF, and HR was recorded by electrocardiogram on admission and before discharge. All data were stored in a specially designed database, and statistically analyzed in the SPSS for Windows.

Results: Mean values on admission vs discharge were for systolic blood pressure 144.63±27.64 mmHg vs 128.04±18.68 mmHg and for diastolic 81.92±15.64 mmHg vs 75.34±13.08 mmHg. PP was >40 mmHg in 127 patients (84.7%; x2-test;p=0.000), with a mean value of 62.5±20.9 mmHg. The majority of patients, 107 (71.3%) had normal MAP (x2-tets;p=0.000), with the mean value 106.82±17.92 mmHg, and only 39 patients (26%) had levels >110 mmHg. Heart rate was elevated in 95 patients (63.3%) on admission and in 77 (51.3%) on discharge, both statistically significant (x2-test;p=0.000), mean values were 96.97±31.31 b.p.m and 84.03±21.61 b.p.m. LVEF was normal in 23.3% and near normal in 52% of patients, with a mean value 45.5±12.52%. There was a significant decrease in SBP, DBP and HR levels during hospitalization (paired t-test; p=0.000; 95% CI).

Conclusions: Hemodynamic status was easily assessed using simple parameters. Hemodynamic disorders in these patients were moderate, and with the use of standard therapy for the management of heart failure, hemodynamic status significantlly improved during hospitalization.

PP.24.12 ECHOCARDIOGRAPHIC DIAGNOSIS OF POSTCAPILLARY PULMONARY HYPERTENSION: A RIGHT1 SUBSTUDY

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Objective: To evaluate the echocardiography for the assessment of left ventricular filling pressures (LVFP) to diagnose the post-capillary PH.
The pulmonary hypertension is observed in 70% of patients with left ventricle dysfunction (systolic or diastolic). In this patients the PH is caused by an increased of left ventricle filling pressures ('postcapillary' PH), with worsening of prognosis. For the correct evaluation of PH, the right heart catheterization is the gold standard test. The echocardiography can give essential informations to orientation the diagnosis.

Design and method: We recruited the patients with diagnosis of PH from the RIGHT1 study (Right heart invasive and echocardiographic hemodynamic evaluation in Turin 1), In all patients the transthoracic echocardiography was performed immediately before or after the heart catheterization, within 60 minutes. We considered a value of pulmonary capillary wedge pressure (PCWP) > 15 to diagnose high ventricular filling pressures. We assessed numerous morphologic values and functional values of left ventricle, and we tested the association between these values and PCWP. Furthermore we assessed the potential benefit of these values to diagnose postcapillary PH.

Results: 192 patients were evaluated with heart catheterization. 128 patients were diagnosed with PH. 38 of these patients were affected by precapillary PH and 90 patients by postcapillary PH. In the PH patients we observed a significant association between PCWP, left atrial volume indexed to BSA (LAVi, R2=0,27; p<0.0001) and E/e' ratio (R2=0,27; p<0,0001). Therefore, with these parameters we implemented a diagnostic algorithm to identify high ventricular filling pressures in the PH patients, in order to diagnose postcapillary PH patients with echocardiography. In our population the application of this algorithm could correctly identify 100% of patients with high ventricular filling pressures (E/E' > 15), with an accuracy of 76%.

Conclusions: Our study confirmed that the echocardiographic parameters with the best association with left ventricular filling pressures in PH patients are E/e' and LAVi. In this population our diagnostic algorithm could improve the diagnostic precision for subgroup's definition (pre vs. post capillary), with a global accuracy of 76%.

PP.24.13 LOW SERUM DHA LEVEL IS RISK FOR EVOLUTION OF CENTRAL HEMODYNAMICS IN WOMEN

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Objective: While abnormal central hemodynamics and abnormal lipid profiles are noted as risks for cardiovascular disease, their association has not been fully clarified. We examined whether serum docosahexaenoic acid (DHA) and eicosapentaenoic acid (EPA) levels are associated with change of central blood pressure in healthy middle aged Japanese men and women.

Design and method: 1,527 healthy Japanese subjects (316 women) were prospectively followed up for three years. Central blood pressure was measured by arterial applanation tonometry. Multivariate linear regression adjusted for established risk factors for raised blood pressure. We conducted overall and stratified analyses by gender.

Results: Mean age was 40±6 years. In a multivariable model controlling for established risk factors for raised blood pressure, both serum DHA and EPA were not significantly associated with change of central blood pressure (both P for trend; >0.05). However, only among women, serum DHA but not EPA was significantly associated with change in central blood pressure. 1standard deviation (SD) decrease of plasma DHA was associated with increased central blood pressure of 1.77 mmHg (P<0.05).

Conclusions: The association of serum lipid profiles with the evolution of central hemodynamics may be different between genders. In women, low DHA levels may be a risk for the progression of abnormal central hemodynamics.

PP.24.14 RESPIRATORY INDUCED HEART RATE VARIABILITY DURING SLOW DEEP MECHANICAL VENTILATION. ADDITIONAL MARKER ABLE TO EXCLUDE BRAIN DEATH PATIENTS

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Objective: We analysed central nervous system activity from respiratory induced heart rate variability (varRR) in mechanically ventilated patients with two levels of sedation and brain death patients. Our aim was to determine whether it is possible to distinguish different levels of sedation and brain death from heart rate and blood pressure parameters.

Design and method: We measured 30 critically ill and 23 brain death patients. Ventilation has been set at four respiratory frequencies – 15, 12, 8 and 6 breaths per minute, each lasting 5 minute. Inspiratory pressure was adjusted on each frequency to maintain the end tidal CO2 equal to baseline. Two sedation levels - basal and deeper was performed in the critically ill patients. The brain dead patients had no sedation and relaxation. We detected and analysed heart rate and blood pressure changes induced by ventilation.

Results: The main result of the study is the finding that varRR is parameter that can more reliably differentiate between brain death patients and sedated critically ill patients. Significant differences exist during slow deep breathing 6 respectively 8 breaths per minute. In the brain death subjects only the reduced value of varRR were found, mostly below 15 respectively 12 ms. In sedated subjects varRR fluctuated in wide range from low to high values up to 40 ms. Parameter varRR was in brain death subjects 8.3±4.1 ms, and in sedated subjects 16.4±5.7 respectively 17.2±9.3 ms (deeper and basal sedation) during 6 breath per minute. The other parameters reflecting respiratory induced blood pressure variability did not show any significant differences between brain death patients and sedated patients.

Conclusions: Comparing numerical results including the results of individual subjects by ROC graphs and confidence ellipses we can conclude that the higher parameter varRR means the smaller probability of brain death. The reduced varRR value is unable to differentiate between brain death and sedated subjects subjects, in contrary the high varRR value reliably excluded brain death subjects. Reduced varRR parameter remain unchanged even after normalisation to respiration volume. Differences between basal and deeper sedation do not appear significant.

PP.24.15 HETEROGENEITY OF VENTRICULAR-ARTERIAL COUPLING INDEX IN HYPERTENSIVE PATIENTS WITH HEART FAILURE WITH PRESERVED EJECTION FRACTION

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Objective: Alteration in ventricular-arterial coupling (VAC) is a proposed mechanism of heart failure with preserved ejection fraction (HFpEF). Arterial hypertension is strongly associated with increased risk of HFpEF. The aim of the study was to compare of VAC in hypertensive subjects with and without HFpEF.

Design and method: VAC was evaluated as ratio of arterial elastance (Ea/Ees, Ea=end systolic pressure (ESP)/stroke volume) and left ventricular elastance (Ees=ESP/End Systolic Volume) in 72 hypertensive patients with HFpEF (27 male, age 69,3±9,0 years, BP 134±23/80±12 mmHg, EF 61,3±8,5% (23 with EF

45-54%), all with NT-proBNP >125 pg/ml) and 20 control hypertensive subjects without HFpEF (8 male, age 64,7±7,9 years, BP 130±19/80±8 mmHg, mean EF 62,3±5,0% (>55% in all patients), all with NT-proBNP <100 pg/m). P<0,05 was considered significant.

Results: Ea/Ees was similar in hypertensive patients with and without HFpEF (respectively, 0,63±0,21 and 0,60±0,09). Altered VAC (Ea/Ees <0,6) was found in 52% and 25%, respectively. There was independent significant negative association between EF and Ea/Ees in HFpEF (β=-0,940, p<0,001). Ea/Ees was significantly higher (0,90±0,14) in patients with HFpEF and EF 45-54% than in those with EF >55% (0,56±0,17), and one might interpret it as normal VAC despite definite clinical sings of HF. Higher Ea/Ees values in HFpEF were associated with more severe clinical HF manifestation. Spearman correlation coefficient r between dyspnea index by Borg's scale and Ea/Ees was 0,38 (p<0,01), between NT-proBNP and Ea/Ees 0,51 (p<0,05).

Conclusions: The heterogeneity in ventricular-arterial coupling index values is observed in hypertensive patients with HFpEF. Low (<0,6) Ea/Ees values which are considered typical for HFpEF are observed in subjects with EF > 55% while subjects with EF 45-54% have Ea/Ees in the range considered as optimal. The term of pseudonormalization of ventricular-arterial coupling index is proposed for interpretation of normal values of Ea/Ees as there is association of them with more severe clinical HF manifestations.

PP.24.16 RADIAL AUGMENTATION INDEX IS ASSOCIATED WITH INCREASE IN B-TYPE NATRIURETIC PEPTIDE IN HYPERTENSIVE PATIENTS DESPITE SIMILAR BRACHIAL SYSTOLIC BLOOD PRESSURE

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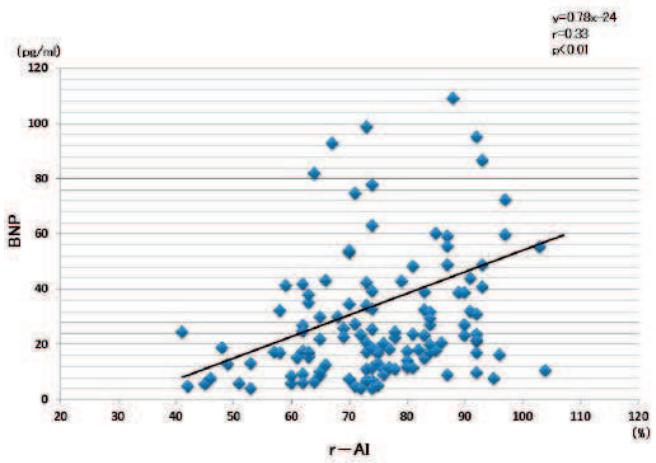
Objective: Radial augmentation index (r-AI), which is an index of wave reflection derived central pressure wave form, represents the measure of additional load on the left ventricle. We investigate the relationship between central hemodynamics, B-type natriuretic peptide (BNP) and echocardiographic parameters in hypertensive patients.

Design and method: We enrolled 132 hypertensive patients who were measured central hemodynamics, brachial systolic blood pressure (bSBP), central systolic blood pressure (cSBP), pulse rate(PR) and r-AI, BNP and echocardiographic parameters within 1 month, and divided them equally into two groups by r-AI, Low r-AI group and High r-AI group. Central hemodynamics were measured noninvasively by HEM 9000-AI (Omron Healthcare Co, Ltd, Kyoto, Japan). The exclusive criteria were heart failure and atrial fibrillation on the measurement of central hemodynamics.

Results: We divided subjects into two groups equally by r-AI (AI=74%). Age and bSBP were not significant difference both two groups (P=0.18, 0.68), however cSBP and BNP level in High r-AI group were higher than them in Low r-AI group (P<0.01, 0.05). Concerning about echocardiographic parameters, ejection wave (EF), stroke volume and E/e', which is index of left ventricular diastolic function, were not significant difference (p=0.14, 0.19 and 0.4). In univariate analysis, age, male, height, weight, r-AI, EF and E/e' were significantly correlated with BNP level, moreover, multiple regression analysis showed that only age and r-AI were correlated with BNP levels (β=0.26 p<0.01, β=0.21 p<0.05).



Conclusions: r-AI had correlated with increase in BNP, independence of bSBP and systolic and diastolic function. r-AI has possible to be validated index of cardiac load in hypertensive patients without heart failure.

PP.24.17 THE EFFECT OF REHABILITATION PROGRAMS ON ARTERIAL STIFFNESS, CENTRAL BLOOD PRESSURE AND LIPID PARAMETERS

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Objective: Physical training has a positive impact on cardiovascular risk factor, lowering also some of the hemodynamic parameters.
Our goal is to demonstrate that the exercise training may improve some of the lipid parameter, the central hemodynamic parameters and the vascular stiffness.

Design and method: We selected 115 hypertensive patients with high cardiovascular risk, according to ESC. The patients were under stable medication in the last 2 months. They were divided into two groups: group A 56 patients and group B: 59 patients. The patients in group A were included in a comprehensive rehabilitation program that consists in lifestyle changes and physical training. Group B was control-group. They were evaluated at baseline and after 4 months. We study the following parameters: Central aortic systolic blood pressure (SBPao), Central aortic pulse pressure (PPao) Pulse wave velocity (PWVao), Total cholesterol (TC), Triglyceride (TG).

Results: After 4 month: the PWVao in group A has decreased with 1.28 m/s (p 0.008); The PWVao in group B has increased with 0.09 m/s (p 0.098); The SBPao in group A has decreased with 8.5 mmHg (p <0.001); The SBPao in group B has increased with 0.9mmHg (p 0.074); The PPao in the group A has decreased with 6.0 mmHg (p 0.009); The PPao in group B has decreased 0.9mmHg (p 0.047); The TC in the group A has decreased with 39mg/dl (p<0.001); The TC in the group B has increased with 9mg/dl (p 0.058); The TG in the group A has decreased with 25mg/dl (p 0.023); The TG in the group B has decreased with 3mg/dl (p 0.083).

Conclusions: Patients can benefit after an exercise training program improving some of the central BP parameters: SBPao, PPao. Physical training, part of the cardiovascular rehabilitation has a positive impact on arterial stiffness PWVao. Rehabilitation programs are also a safe and effective method for reducing cardiovascular risk. Exercise training may holdup the large arterial stiffening and in this way we estimate to delay the arterial ageing.

PP.24.18 EXPLORING THE CONTRIBUTION OF THE WINDKESSEL PRESSURE TO THE CENTRAL PRESSURE WAVEFORM USING NITROGLYCERIN AND NUMERICAL MODELLING

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Objective: The Windkessel model of blood flow in the cardiovascular system was proposed by Frank in the 18th century. However the contribution of the Windkessel pressure waveform to the central pressure waveform is not fully understood yet. Recent investigations suggest that changes in the central aortic index (cAI) are due to changes in the buffering function of the aorta through the Windkessel effect. We explored the contribution of the Windkessel pressure to the cAI in ten normotensive volunteers under the effect of nitroglycerin.

Design and method: Measurements of cross-sectional area at the aortic root and three subsequent locations along the aorta were taken using MR imaging, at baseline and under the administration of nitroglycerin. This is a well-known vasodilator which selectively dilates muscular arteries without altering the pulse wave velocity.
We used a verified 55-artery, one-dimensional, nonlinear model of pulse wave propagation in the arterial tree of a normal healthy volunteer to simulate the aortic pressure waveform at baseline. A novel algorithm was applied to the 10 aortic segments in order to specify the measured cross-sectional area at the four sites for each patient, before and after the administration of nitroglycerin. Thus we personalised the individual responses in the aorta to nitroglycerin, and produced physiologically relevant levels of tapering, and aortic volume.

Results: The resultant cAI from the simulations before and after the administration of nitroglycerin replicated the in vivo results.
However the extent to which the simulation mimicked the systolic and diastolic

pressure when compared to the in vivo was less. According to our model this is due to nitroglycerin having a dilatory effect on the peripheral vessels, which we simulated by reducing peripheral resistances and increasing peripheral compliances.

Conclusions: Our results suggest that cAI is mostly dependent upon the Windkessel function of the aorta.

PP.24.19 LEFT VENTRICULAR FUNCTION AND ARTERIAL PULSATILITY AS DETERMINANTS OF INTRARENAL RESISTANCE IN PATIENTS WITH ESSENTIAL HYPERTENSION

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Objective: Recent studies indicate thatrenal resistive index (RI) reflects not only intrarenal, but also systemic haemodynamic conditions.The present study sought to evaluate the role of left ventricular function and vascular pulsatility as determinants of intrarenal resistance in patients with essential hypertension.

Design and method: A total of 409 consecutive, newly diagnosed, never treated, essential hypertensive patients grade 1-3, (mean age 51±13 year, 52% male), referred to the outpatient antihypertensive unit of our institution were studied. Diabetic individuals and those with overt cardiovascular or renal disease were excluded. A detailed echocardiographic study was performed to all participants. Left ventricular diastolic function was evaluatedwith conventional transmitraland tissue Doppler imaging (TDI) from six basal segments of the left ventricle (LV). Stroke volume was calculated multiplying left ventricular outflow tract (LVOT) velocity time integral with cross sectional area and normalized by body surface area (BSA). Ambulatory 24 hour pulse pressure was used as an index of arterialpulsatility. Moreover, all patients underwent renal Doppler ultrasound with RI measurement. The mean value of RI from both kidneys was used for the analysis.

Results: The mean±SD value of RI was 0.62±0.07, higher in females than in males (0.64±0.06 vs. 0.60±0.06, p<0.001). Correlations between RIand indices of LV function or demographic variablesare presented in Table.Diastolic function deterioration and increase in stroke volume were associated with increased RI valuesin both genders.Multivariable regression analysis revealed that independent predictors of RI were gender (b=-0.04, p<0.001), 24-hour heart rate (b=-0.001, p<0.001), 24-hour pulse pressure(b=0.002, p<0.001), transmitral E/A ratio (b=-0.02, p=0.048), TDI mean Em/Am ratio (b=-0.034, p<0.001) and stroke volume index (b=0.001, p=0.008).

Correlations of renal resistive index		
	Female (n=197)	**Male (n=212)**
Age	r=0.608, p<0.001	r=0.568, p<0.001
Height	r=-0.145, p=0.042	r=-0.229, p=0.001
Heart rate	r=-0.229, p=0.001	r=-0.165, p=0.016
Transmitral E/A ratio	r=-0.116, p=0.105	r=-0.198, p=0.004
Transmitral velocity time integral	r=0.324, p<0.001	r=0.235, p=0.001
Transmitral atrial velocity time integral	r=0.302, p<0.001	r=0.283, p=0.001
TDI mean Em/Am ratio	r=-0.228, p=0.001	r=-0.259, p<0.001
E/Em ratio	r=0.301, p<0.001	r=0.152, p=0.027
Left atrial anteroposterior diameter	r=0.159, p=0.026	r=0.173, p=0.012
LV diastolic dysfunction	r=0.184, p=0.010	r=0.176, p=0.012
LVOT velocity time integral	r=0.150, p=0.038	r=0.238, p=0.001
Stroke volume indexed to BSA	r=0.183, p=0.011	r=0.242, p<0.001
Aortic valve velocity time integral	r=0.265, p<0.001	r=0.311, p<0.001
Left ventricular ejection time	r=0.378, p<0.001	r=0.140, p=0.043

Conclusions: In middle-aged never treated essential hypertensive patients, left ventricular diastolic dysfunction and vascular pulsatilityemerge asstrongmodifiers of renal microcirculation resistance.

PP.24.20 BRAIN NATRIURETIC PEPTIDE AS DETERMINANT OF RENAL RESISTIVE INDEX IN PATIENTS WITH ESSENTIAL HYPERTENSION

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Objective: Renal resistive index (RI) reflects not only intrarenal, but also systemic haemodynamic conditions. Brain natriuretic peptide (BNP) is released by ventricular myocardium in response to high loading conditions. The present study sought to explore the relationship between BNP levels and RI in patients with essential hypertension.

Design and method: A total of 409 consecutive, newly diagnosed, never treated, essential hypertensive patients grade 1-3, (mean age 51±13 year, 52% male), referred to the outpatient hypertensive unit of our institution were studied. Diabetic individuals and those with overt cardiovascular or renal disease were excluded. The evaluation of participants and target organ damages was performed in accordance to the European Society of Hypertension guidelines. Moreover, all patients underwent renal Doppler ultrasound with RI measurement. The mean value of RI from both kidneys was used for the analysis. Measurement of BNP was performed with an immunoassay method. Based on BNP levels the study population was split into quartiles (A <5.2, B 5.2-11.9, C 11.9-24.5, D >24.5 pg/ml).

Results: The mean±SD value of RI was 0.62±0.07 and the median value of BNP was 11.9 (5.2-24.6) pg/ml. RI was significantly and positively correlated with BNP levels (r=0.393, p<0.001). Patients in the highest BNP quartile (D) compared to those in the lowest quartile (A) were older, more frequently female, with lower 24-hour diastolic blood pressure and heart rate (Table). Moreover, indices of left ventricular diastolic dysfunction (i.e. left atrial volume index, transmitral E/A wave ratio, tissue Doppler imaging annular Em/Am ratio, E/Em ratio) and aortic stiffness (i.e. carotid-femoral pulse wave velocity, augmentation index) were found to be more impaired in group D, while no significant differences between groups were found with regard to indices of systolic function. According to multivariate regression analysis, BNP remained an independent predictor of RI, after adjusting for age, gender, body mass index, glomerular filtration rate and 24-hour blood pressure (b=0.032, 95%CI: 0.0028-0.062, p=0.032).

	BNP Quartiles				
Variables	**A** (<5.2 pg/ml)	**B** (5.2-11.9 pg/ml)	**C** (11.9-24.5 pg/ml)	**D** (>24.5 pg/ml)	**p-value**
Age, years	43±14	47±14	56±11	61±10	<0.001
Gender, % female	26	32	54	69	<0.001
Body mass index, kg/m²	29±5	28±4	28±5	28±4	0.322
24-hour systolic blood pressure, mmHg	125±11	125±13	120±12	126±14	0.481
24-hour diastolic blood pressure, mmHg	77±9	76±9	77±10	71±11	0.003
24-hour heart rate, beats per minute (bpm)	76±8	73±10	72±8	69±9	0.001
Left atrial volume index (LAVI), ml/m²	19±5	18±5	19±5	23±6	<0.001
Transmitral E/A wave ratio	1.2±0.5	1.2±0.4	1.0±0.4	1.0±0.3	0.025
Tissue Doppler Imaging mean annular Em/Am ratio	1.1±0.5	1.0±0.4	0.9±0.3	0.9±0.3	<0.001
E/Em ratio	7±2	7±2	8±2	9±3	<0.001
Left ventricular mass indexed to height$^{2.7}$, g/m$^{2.7}$	41±9	39±9	40±8	42±9	0.273
Left ventricular ejection fraction, %	65±6	66±5	64±6	64±6	0.572
Carotid-femoral pulse wave velocity (PWV), m/sec	7.9±1.3	8.1±1.7	8.7±1.6	9.0±2.2	0.002
Augmentation Index adjusted for 75 bpm (AIx@75), %	21±14	23±13	28±8	29±7	0.011
Renal resistive index (RI)	0.60±0.05	0.60±0.06	0.63±0.06	0.66±0.06	<0.001

Conclusions: Conditions of increased cardiac loading seem to be associated with increased RI in patients with essential hypertension while BNP emerge as an independent determinant of RI.

PP.24.21 FUNCTIONAL EFFECTS OF AGE-RELATED AORTIC STIFFENING ARE OFFSET BY AORTIC DILATATION

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Objective: Vascular aging is characterised by increased stiffening and dilation of the proximal aorta. Pulse wave velocity (PWV), the "gold standard" functional measure of aortic stiffness is influenced not only by the intrinsic elasticity of the aortic wall, but also by aortic wall thickness and diameter as shown by the Moens-Korteweg equation. We investigated whether age-related dilation of the proximal aorta may thus offset the age-related increase in intrinsic aortic elasticity.

Design and method: Twenty two asymptomatic women (age range 56-75 years) underwent magnetic resonance imaging between 2009-2010 and approximately 3 years later between 2012-2013. Phase-contrast magnetic resonance imaging (MRI) was performed at the level of the ascending aorta and diaphragm to calculate thoracic PWV. Aortic wall diameter and wall thickness were measured at the same level and averaged over the same aortic region using a black blood imaging sequence. Young's incremental elastic modulus (E) was calculated from the

simplified Moens-Korteweg equation: PWV = √Eh/D, where h is average wall thickness and D is average aortic diameter. Three participants did not complete phase-contrast magnetic resonance at follow-up and were excluded from analysis.

Results: There was no significant difference in thoracic PWV between baseline and follow-up visit (mean±standard deviation for thoracic PWV at visit 1 and visit 2: 7.34±1.0 and 7.59±1.53 m/sec respectively, P=0.41). By contrast, there was a significant increase in the elastic modulus estimated over the same region (3.67±0.9 and 4.43±1.8 10 6 dynes/cm² respectively, P<0.05). The dissociation between the change in PWV and E was explained by an increase in thoracic diameter over the follow-up period (diameter for visit 1 and visit 2 respectively: 2.53±0.1 and 2.61±0.1 cm, P<0.0001). There was a small but significant decrease in wall thickness (wall thickness for visit 1 and 2 respectively: 0.37±0.03 and 0.36±0.03 cm, P<0.05).

Conclusions: In our cohort of older women, intrinsic stiffness as measured by E, but not PWV, increased over a follow-up period of 3 years. Dilation of the thoracic aorta and changes in wall thickness may offset effects of intrinsic stiffening of the aortic wall on functional measures of stiffness such as PWV.

PP.24.22 HEART RATE AND THE ASSOCIATION WITH VASCULAR REMODELING

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Objective: The increased basal heart rate (HR) was classically associated with increased cardiovascular risk (CVR). HR as blood pressure (BP), has circadian pattern related to the autonomous nervous system activity. We hypothesized about the relationship between the circadian rhythm of HR and vascular remodeling (VR), independant of the blood pressure.OBJETIVES;To evaluate the relation between nocturnal dipping pattern of HR (NDHR) and VR, and secondary, NDHR as an independent marker of VR.

Design and method: 200 patients were evaluated in a cardiovascular prevention program, between (January 2012 – May 2013). After exclusion criteria, the final population were 150 patients (67% males, 50±10 years old, BMI 28± 4.5, 76% controlled hypertensive, 24% normotensives). We measured ABPM, CIMT in both arteries, and atherosclerotic plaques (AP) detection in the same territory. We defined VR as the presence of CIMT >=0.9 mm and or the presence of AP and Non- NDHR as a nocturnal drop of HR <= 17 % (ROC) and dipping pattern of blood pressure (DBP) (ESH guidelines). We preformed linear correlations between nocturnal drop in HR and BP with the maximal CIMT (Pearson) and the media drops in HR and BP with the presence or absence of AP. Finally we performed a logistic regression between VR as a dependent variable, and, age, sex, BMI, dipping pattern of BP/HR as independent variables.

Results: The NDHR, showed an inverse relationship with CIMT (r= -0.25; p= 0.002). There was non- NDHR in patients with AP (Plaques no 18% vs Plaques yes 14%; p< 0.001). The DBP also showed an inverse relationship with CIMT (r= -0.21, p=-0.01), but we saw a lesser drop in BP in patients with AP (Plaques no 15,1% vs Plaques yes 13.0%, p= 0.06). In the logistic regression (Table 1), the NDHR and age were independent predictors of VR, beyond BP.

Conclusions: HR behavior and target organ´s compromise are related, beyond BP. The non-dipping pattern of HR may be an independent predictor marker of CV risk. We need to know if modification of this variable may have further CV benefits.

PP.24.23 TO ESTIMATE PERCENT OF RESPONDERS IN ACUTE PULMONARY VASODILATOR TESTING DURING THE RIGHT HEART CATHETERIZATION WITH INHALED NITRIC OXIDE IN PATIENTS WITH PULMONARY HYPERTENSION

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Objective: To estimate percent of responders in acute pulmonary vasodilator testing during the right heart catheterization with inhaled nitric oxide in patients with pulmonary hypertension (PH) in Russian population.

Design and method: Acute pulmonary vasodilator testing during the right heart catheterization was made to 156 patients with PH of various etiology: 92 were with IPAH, 21 with CHD, 31 with CTD and 12 with CTEPH. Mean age was 49 [38-59] years, 82,3% women /17,7% men. A positive acute response is defined as a reduction of mean pulmonary arterial pressure (PAPm) >= 10 mm Hg to reach an absolute valve of PAP <= 40 mm Hg with an increased or unchanged cardiac output.

Results: 32,7% of patients with PH appeared responders: 40 from 92 (43,5%) patients with IPAH had positive acute response; 7 from 31 (22,6%) patient with CTD; 3 from 21 (14,3%) patient with CHD ; 1 from 12 (8.3%) patient with CTEPH.

Conclusions: In frequency of positive acute pulmonary vasodilator testing with inhaled NO depends on PH etiology and was maximal in IPAH and minimal in CTEPH.

PP.24.24 PHENOTYPING THE RETINAL MICROCIRCULATION BY USE OF IMPEDANCE CARDIOGRAPHY: ASSOCIATION BETWEEN EARLY RETINAL ALTERATIONS AND HEMODYNAMIC PROFILE

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Objective: Ratio of the caliber of retinal arterioles to venules (arteriovenous ratio, AVR) has been used as an easy and widely applied index of early-stage hypertensive retinopathy, with several multitudinal studies validating its prognostic value in terms of cardiovascular morbidity and mortality. Hypertensive patients may exhibit diverse cardiovascular abnormalities and impedance cardiography has been proposed as a valuable tool for the stratification of patients according to their hemodynamic profile.The aim of the present study was to investigate whether any association exists between retinal AVR and hemodynamic parameters assessed with cardiography impedance, in a population lacking the complications of sustained hypertension.

Design and method: We studied consecutive subjects attending the Hypertension Unit of our Department. Only individuals free from any known disease and under no medication, who reported normal blood pressure (BP) measurements within the previous year, were included. Retinal photography was used to obtain retinal microvascular diameter measurements and subsequently AVR, using specifically designed, semi-automated software. All participants underwent impedance cardiography for the measurement of hemodynamic parameters, including stroke volume (SV), cardiac output (CO), thoracic fluid content (TFC), and systemic vascular resistance (SVR).

Results: A total of 46 otherwise healthy individuals apart from increased BP were included, 34 male and 12 female aged 43.8±9.8 years, with a mean systolic/diastolic BP of 143.8±18.6/90.4±11.2 mmHg. Mean AVR was 0.74±0.11. Mean SV was 97.1±28.5 ml, mean CO was 7.0±1.7 l/min, mean TFC was 32.3±4.7 l/kOhm, and mean SVR was 1171.9±312.2 dyn•s•cm-5. Of these parameters, only SVR significantly correlated with AVR (r=0.410, p=0.012). SVR was identified as the only independent predictor of AVR after adjustment for other variables (age, sex, body mass index and BP) in the multiple regression model (p=0.012).

Conclusions: Using non-invasive, easily applicable, low-cost technology, the present study demonstrates for the first time an inverse association between SVR and AVR in a meticulously selected population free from the effects of long-standing hypertension. Whether increased SVR is the cause or consequence of decreased AVR warrants future studies.

PP.24.25 VENTRICULAR-ARTERIAL COUPLING AND ITS DETERMINANTS IN PATIENTS WITH ARTERIAL HYPERTENSION AND HEART FAILURE WITH REDUCED EJECTION FRACTION

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Objective: The aim of the study was to examine ventricular-arterial coupling (VAC), left ventricular (LV) work efficiency and its determinants in patients with arterial hypertension (HTN) and stable heart failure with reduced ejection fraction (HFrEF).

Design and method: In 93 stable patients (75% male, age 64±9 years (M±SD), myocardial infarction 67%, diabetes mellitus 32%, heart rate 75±13/min, II/III NYHA class 25/75%, blood pressure (BP) 131±14/80±10 mmHg) with HTN, symptoms and signs of HF, LVEF <40% (34±5%) and N-terminal pro-brain natriuretic peptide (NT-proBNP) >100 pg/ml (650±679 pg/ml) 2-dimentional echocardiography was used to assess arterial elastance (Ea) and end systolic LV elastance (Ees). VAC was assessed as Ea/Ees. Mann-Witney test was performed. Clinical and demographic parameters, parameters of LV function and arterial stiffness were included in multivariate analysis. P<0.05 was considered significant.

Results: The range of VAC was 0.9-4.7. VAC >1.2 (upper optimal level) was revealed in 87%. In patients with VAC <1.5, 1.5< VAC <3.3 and VAC >3.3 Ea was 0.96, 0.79 and 0.99 mmHg/ml/m² (p>0.05), Ees 0.81, 0.41 and 0.29 mmHg/ml/m² (p<0.001), stroke work (SW) 3550, 4403 and 3324 mmHg*ml/m² (p>0.05), potential energy 2148, 3940 and 6389 mmHg*ml/m² (p<0.001), pressure-volume area (PVA) 5697, 8349 and 9713 mmHg*ml/m² (p<0.001), SW/PVA 62, 53 and 35% (p<0.001). Ea positively correlated with aortic systolic BP (beta=0.66), office diastolic BP (beta=0.27), arterial peripheral resistance (beta=0.61), systole duration (beta=0.61), negatively - with body mass index (BMI) (beta=-0.97). Elv positively correlated with LVEF (beta=0.26), office systolic (beta=0.54) and diastolic BP (beta=0.33), negatively – with left ventricular mass index (LVMI) (beta=-0.54). Increased VAC was associated with decrease of office (beta=-0.2) and aortic systolic BP (beta=-0.13), BMI (beta=-0.13), LVEF (beta=-0.76), increase of LVMI (beta=0.07) and NT-proBNP (beta=0.16).

Conclusions: Impairment of functioning of cardio-vascular system assessed by increased value of VAC >1.2 was revealed in 87% of patients with HTN and stable HFrEF. Increase of VAC is associated predominantly with decrease of Ees and LV work efficiency (SW/PVA). In HFrEF LV and arterial system matched to maximize SW. VAC and its components are associated with echocardiographic parameters and markers of arterial stiffness.

PP.24.26 CARDIAC MAGNETIC RESONANCE AND APPLANATION TONOMETRY FOR NON-INVASIVE DETERMINATION OF ASCENDING AORTIC IMPEDANCE AND THEIR CHANGES WITH AGING

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Objective: Limited invasive (electromagnetic) ascending aortic (AA) flow wave contour indicates impaired left ventricular (LV) function in the elderly. Conventional non-invasive (Doppler) recordings have not shown similar change of impedance pattern with aging. Our study aims to determine AA impedance from AA flow, measured using Cardiac Magnetic Resonance Imaging (CMRI), and carotid pressure (CP) waves, measured using applanation tonometry, in an apparently normal cohort. We then compared results with previously reported for invasive and realistic arterial model.

Design and method: Fifty subjects (21-70 years, 28 males) underwent velocity-encoded AA CMRI using a 1.5T system (Signa, GEMS, Waukesha, USA). Tonometric CP waveforms (as surrogate of AA pressure), recorded sequentially after CMRI, were calibrated using brachial pressures measured during CMRI examination. Impedance was determined by relating in modulus and phase, corresponding frequency components of the AA flow velocity with CP.

Results: Peak AA velocity decreased substantially (p<0.0001) from =< 50 years (66.7 ± 17.7cm/s) to > 50 years subjects (47.7 ± 12.7cm/s). Late systolic flow was relatively lower in the older than in the younger subjects. Values of impedance modulus and phase were similar to those previously reported in invasive studies (averaged 656 dyne.s.cm-3 between 2 – 6 Hz), with first 3 harmonic modulus being higher in older (averaged 1227 dyne.s.cm-3) than younger subjects (averaged 730 dyne.s.cm-3). Values of AA impedance fall within the range calculated for a realistic model of arterial system between age 20 - 80 years.

Conclusions: AA flow waves recorded by CMRI showed aging changes which are not apparent in conventional Doppler flow patterns. Our finding warrants further use of AA CMRI flow and CP waveforms to characterize aging changes and ill-effects of stiffened central arteries. AA impedance values calculated non-invasively from AA CMRI flow and CP waveforms show the same pattern as described in invasive studies and lie within the same range as predicted from models at age 20 - 80 years. These features explain the basis of LV impairment from early and increased wave reflection during systole, and suggest reduction of wave reflection as strategy for treating heart failure in the elderly.

PP.24.27 THE SIGNIFICANCE OF ARTERIAL HYPERTENSION LEVEL IN DEVELOPMENT OF HEART REMODELING

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Objective: To study the influence of arterial hypertension(AH) level in development of heart remodeling in patients with essential hypertension (EH).

Design and method: The study included 75 male and female patients with stage II-III EH (WHO, 2007) with an average age of 54.4±8.5 years. Mean duration of arterial hypertension was 8.8±5.4 years. M- and B-mode echocardiographic examination was performed. Left ventricular mass index (LVMI) was calculated as a relation of left ventricular myocardium mass to body surface area. Presence of left ventricular hypertrophy (LVH) was diagnosed when LVMI>125 g/m2 in male and >110 g/m2 in female. Diastolic heart function was assessed by the following Doppler-echocardiographic indices: peak early filling velocity and arterial filling velocity correlation (PE/PA). Results were expressed as mean±SD.

Results: Patients were divided in to two groups: I group- with II degree of AH and II group with III degree of AH. The interventricular septal thickness was 11.9±2.0 mm in group with II degree of AH versus 13.0±2.0 mm in group with III degree of AH(p<0.05). The left ventricular end diastolic diameter was 55.0±4.2 mm in group with II degree of AH versus 57.9±5.0 mm in group with III degree of AH(p<0.05). The left ventricular end systolic diameter was 35.2±3.6 mm in group with II degree of AH versus 38.1±4.1 mm in group with III degree of AH(p<0.05). There were found significant differences in LVMI depending on arterial hypertension level. LVMI was following: 167.57±42.91 g/m2 in patients with II degree of AH and 195.75±44.89 g/m2 in patients with III degree of AH (p<0.05). The decrease of ejection fraction was revealed in patients with III degree of AH: 62.38±4.12% versus 64.96±4.29% in patients with II degree of AH(p<0.05). There were not found significant differences in PE/PA correlation in studied groups.

Conclusions: Comparative study of central hemodynamics parameters into account of arterial hypertension degree was revealed significant association of pronounce of LVH in patients with III degree of AH.