Design and method: A total of 81 consecutive never treated individuals referred for evaluation at the Hypertension Unit of our department, underwent 24-h ambulatory BP monitoring at baseline and 1 month. Subjects with 24-h BP values > = 130/80mmHg were defined as hypertensives, whereas those with 24-h BP < 130/80mmHg as normotensives. Short-term BP variability was expressed by standard deviation (SD), time rate of BP variation (TR), average real variability (ARV) and coefficient of variation (CV) of systolic and diastolic BP for both 24-h, daytime and nighttime intervals. Statistical analysis was performed by means of reliability analysis (intraclass correlation coefficient (ICC)).

Results: Our study population consisted of 22 normotensive (27%) and 59 hypertensive subjects (73%). In normotensive individuals all 24-h and daytime systolic BP variability indices had moderate reproducibility (ICC 0.500–0.749). Good reproducibility was observed in 24-h SD (ICC 0.826, $p < 0.001$), 24-h CV (ICC 0.832, $p < 0.001$) and daytime CV (ICC 0.750, $p = 0.002$) of systolic BP. Hypertensive patients presented moderate reproducibility in most of BP variability indices. Indices with good reproducibility were 24-h SD of systolic BP (ICC 0.751, $p < 0.001$), 24-h SD of diastolic BP (ICC 0.750, $p < 0.001$), 24-h CV of systolic BP (ICC 0.750, $p < 0.001$) and 24-h CV of diastolic BP (ICC 0.765, $p < 0.001$). In contrast, indices with poor reproducibility were daytime TR and AVR of systolic and diastolic BP and all nighttime BP variability indices, except for nighttime TR and ARV of systolic BP.

Conclusions: The reproducibility of short-term BP variability varies greatly. In hypertensive patients the most reproducible indices were 24-h SD and CV of systolic and diastolic BP.

HOW WE CAN TRUST MEASURES OF BPV SINCE IT'S VALUE IS SO VARIABLE ITSELF?

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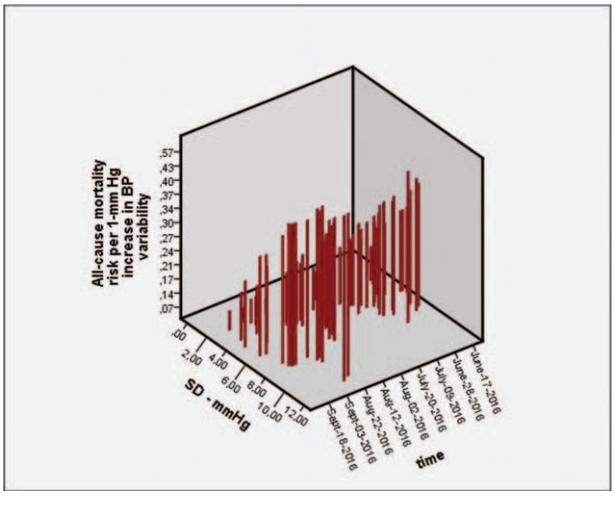
Objective: In recent years an increasing attention has been paid to blood pressure variability (BPV) because some evidence suggests that it is related to the presence of target organ damage and to the risk of cardiovascular events; home blood pressure (HOME BP) could be an easy way to evaluate medium-term variability as shown by the Ohasama study. However, very rarely HOME BP is measured regularly and/or recorded appropriately. One of our patient measured her BP almost every day for about 5 months (a total of 306 measures because some days she took more than one measurement); during this period the anti-hypertensive therapy was unchanged and the compliance was excellent (from the daily diary it was possible to confirm also a very regular life-style).



Design and method: We calculated average BP and BPV in subsets of these measures (morning vs evening and each month separately).

Results: Overall BP control was excellent (average systolic BP = 120 mmHg; average diastolic BP = 81.8 mmHg) and BPV, measured as SD was 6.56 mmHg (CV = 5,5%) for systolic and 4.99 mmHg (CV = 6.1%) for diastolic; while average BP was similar in the morning and in the evening, BPV was different (9.44 vs 8.46 mmHg) for systolic; moreover, BPV calculated on the HOME BP taken during each month was quite variable (from 5.15 to 8.5 mmHg, that is + 30% or -21% from the mean for systolic and from 3,97 to 6.83 mmHg, that is +37% or – 20% from the mean for diastolic). We calculated also AVR (average real variability) in the different subsets with similar results. In Figure 1 we show the variable all-cause-mortality risk-increment during BP follow-up according to the recent published literature.

Conclusions: We believe that the variability of BPV measures observed in this patient arises some doubts about its value as a prognostic index as it does not appear stable within the single patient.
In other words BPV is too variable to be useful!

SEASONAL CHANGES OF THE CIRCADIAN BLOOD PRESSURE RHYTHM IN HYPERTENSIVE PATIENTS

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Objective: The seasonal variability of ambulatory blood pressure (ABP) in hypertensive patients became the subject of multiple studies during the past decade. The investigation of the particular aspect of this problem, concerning the BP rhythm, could inform the development of a seasonal-tailored chronotherapeutic approach to antihypertensive treatment (AHT). The exploration of this problem in Russia is particularly promising due to the multitude of climate conditions across different regions. The aim of the study was to assess the seasonal changes of nocturnal blood pressure fall (NBPF) in hypertensive patients from two sites in the Russian Federation – Ivanovo (relative north) and Saratov (relative south).

Design and method: We included patients from the general population who visited ambulatory clinics for various reasons. The main inclusion criterion was office BP 130/85–139/89 mm Hg or long-term AHT. The ambulatory blood pressure monitoring (ABPM) was performed twice in each patient: in winter (December-February 2012–2014) and in summer (June-August 2012–2014). The interval between ABPMs was 6 months ± 7 days. The selection criteria for ABPM records were: duration > 23.5 hours, absence of data gaps > 1 hour, > 55 readings per 24 hours. We analyzed the factors associated with the NBPF levels > 10% in the whole sample. The stepwise multivariate logistic regression model was used to select the most valuable factors. The analysis was adjusted for age, sex, and AHT.

Results: 1,766 patients were enrolled, and 770 of them completed both visits - 499 from Ivanovo (mean age 52 ± 10 years, 181 men), and 271 from Saratov (mean age 58 ± 11 years, 151 men). The NBPF levels were higher in Ivanovo and in winter. We observed the average systolic NBPF values below 10% in Saratov within both seasons, which reflects the non-dipper tendency. According to the multivariate logistic regression analysis, the following factors were associated with both systolic and diastolic NBPF values (>10% - see table).

Factors associated with normal systolic/diastolic NBPF values

Factors	β	p
Ivanovo residency	0.439/0.838	0.0001/0.0001
Low physical activity	-0.415/-0.577	0.010/0.012
Diastolic BP in orthostasis	0.017/0.015	0.002/0.010
Outdoor temperature*	-0.015/-0.017	0.001/0.0001

* Average temperature during the first and second days of ABPM

Conclusions: The nocturnal hypertension and non-dipper tendency were more typical for Saratov residents and may be explained by relatively hot summers and poor sleep quality. The direct association between outdoor temperature and NBPF warrants further research.

ARTERIAL HYPERTENSION IN REMOTE PERIOD AFTER MYOCARDIAL INFARCTION AND ISCHEMIC STROKE: QUALITY OF CONTROL, ASSOCIATION WITH OTHER RISK FACTORS

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Objective: In Ukraine cardiovascular mortality is one of the highest in Europe. Arterial hypertension (AH) is one of the most important modifiable risk factors and its active control is a cornerstone of primary and secondary prevention.

Design and method: Secondary prevention assessment was performed in Ukrainian city Lutsk in representative sample of 166 patients after ischemic stroke (PostIS) (age 66,1 ± 9,0 years, 98 men) and 265 patients after myocardial infarction (PostMI) (age 64,9 ± 9,8 years, 181 men) randomly selected from 2200 consecutive patients hospitalized in one city hospital 1 to 5 years before inclusion. The home-based blood pressure (BP), anthropometric measurements, questionnaire, and laboratory tests were performed.

Results: The trend to higher AH prevalence was found in PostIS patients (77,7% vs 69,1%, p = 0,09). This finding was associated with higher BP in PostIS patients

(systolic 145,8 ± 25,0 vs 140,0 ± 22,8 mmHg in PostIM, p = 0,014, diastolic 86,8 ± 13,8 vs 83,6 ± 12,1 mmHg, p = 0,013), and smaller proportion of treated patients PostIS - 78,7 vs 86,7% PostIM. AH control was low in both groups: only 23,0% PostIS and 26,1% PostIM patients had BP < 140/90 mmHg (p = 0,18). This finding corresponded with low mean number of antihypertensive drugs per patient - 1,7 ± 1,1 vs 1,8 ± 1,1 respectively; p = 0,28. Worse AH control in PostIS patients was associated with less tight physician control (57,1% vs 66,0% PostMI patients contacted to doctor during last 3 months, p = 0,05), lower physical activity (29,9% in PostIS vs 37,4% in PostMI had regular activities; p = 0,04). No difference in prevalence of obesity, smoking, diabetes, as well as lipids and glucose levels was detected.

Conclusions: Inadequate AH control was found in both PostIS and PostMI patients. The worse situation in PostIS patients was associated with lower number of patients who regularly took antihypertensive medications and worse physician control. It is necessary to take active efforts to improve the situation.

CORRELATION OF OBSTRUCTIVE SLEEP APNOEA AND ARTERIAL STIFFNESS AS CARDIOLOGIC RISK FACTORS

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Objective: The presence of hypertension is a very well stabilished risk factor for the development of future cardiovascular complications, such as AMI and stroke. Recent data suggest a strong association of arterial stiffness as a new risk factor for cardiovascular disease. The presence of obstructive sleep apnea has a strong association with hypertension, especially on those with resistant hypertension. The aim of this study was to evaluate the association of obstructive sleep apnea and arterial stiffness as risk factors for future cardiovascular events in a population of patientes at a hypertension clinic.

Design and method: We evaluated 14 patients at a private hypertension clinic using a home sleep test with a class 3 device type Resmed Apnealink Plus and an office assessment of arterial stiffness with Mobil O´Graph device and registered pulse wave velocity and Augmentation Index @75bpm. to observe the coexistence of obstructive sleep apnea and elevated pulse wave analyses, probably due to increased arterial stiffness. The data were analysed, including a subanalyses of the population according to BMI sex, and age.

Results: The group consisted of 14 patients. 21,4% were female, with age ranging from 33 to 80 years old (average of 55,13 +-13). The average BMI was 28,9 +-5. 4 patients had mild obstructive sleep apnea (OSA), [5]had moderate OSA and 5 had severe OSA. 8 patients had type 2 D. mellitus. The mean pulse wave velocity was 8,05+-1,7, ranging from 5,8 to 11,4 m/s. The mean systolic central arterial pressure was 131,2 +-15mmHg and 84,8 +-15mmHg for diastolic central arterial pressure. In the subgroup with severe sleep obstructive apnea, the mean pulse wave analysis was 8,52 and apneia-hipopneia index was 49,6. There was no straight relationship of elevated apneia-hipopneia index and increased pulse wave velocity, representing increased arterial stiffness, including in the subgroup of diabetec patients.

Conclusions: Despite the presence of obstructive sleep apnea and increased arterial stiffness are both considered strong predictors of cardiovascular events, we found no correlation between these 2 findings in the studied population at the same time.

COMPARISON OF NON-INVASIVE CENTRAL BLOOD PRESSURE MEASUREMENTS WITH PERIPHERAL BLOOD PRESSURE MEASUREMENTS IN THE DIAGNOSTIC, PROGNOSTIC AND THERAPEUTIC AREAS. SYSTEMATIC REVIEW

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Objective: Arterial hypertension is a major public health problem and current recommendations call for a review of the literature on the contribution of non-invasive central blood pressure (BP) estimation.

Design and method: We performed a systematic review of systematic reviews that compare non-invasive central BP with peripheral BP measurements in the diagnostic, prognostic and therapeutic areas, including a comprehensive research in databases and grey literature, and a qualitative analysis according to the ROBIS and AMSTAR tools.

Results: Among 1738 bibliographic references, 8 publications were selected. This systematic review shows for central BP. as compared to peripheral BP. in terms of the diagnosis the importance of the calibration method, and in terms of the prognosis the absence of a significant effect on clinical events but a significant effect on surrogate endpoints. In terms of the treatment, it shows that antihypertensive drugs, and in particular bêta-blockers and thiazide diuretics have a greater effect on the decrease in peripheral BP. than on non-invasive central BP, thus leading to a decrease in the arterial pressure amplification.

Conclusions: Basic research on calibration methods is essential to obtain a better estimation of the central BP and to propose clinical studies on a larger scale.

BLOOD PRESSURE CHRONOSTRUCTURE IN ANGIOTENSIN CONVERTING ENZYME INHIBITOR THERAPY

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Objective: To estimate the effect of enalapril and captopril on blood pressure (BP) daily profile and correct drugs dosing according to 24-hour BP monitoring in patients with arterial hypertension (AH).

Design and method: The study included 73 male patients with diastolic BP (DBP) 90–109 mmHg without severe comorbidity and obesity (body mass index 27.9 kg/m2). Patients were randomized into two groups: 1: 37 patients (mean age 38.8 ± 1.3 years) received enalapril, 2: 36 patients (mean age 39.8 ± 1.3 years) received captopril. Adjustment of drug dosage was conducted under 24-hour BP monitoring at the 4th, 8th and 12th weeks of the therapy.

Results: Enalapril and captopril lead to statistic lowering of diurnal mean value (DMV) within 12 weeks of therapy (original data in enalapril group: DMV systolic BP (SBP) 146.6 ± 3.7, DMV DBP 91.6 ± 2.1; 12th week DMV SBP 130.2 ± 2.2; DMV DBP 80.2 ± 1.9; all p < 0.001; original data in captopril group: DMV SBP 142.4 ± 1.3, DMV DBP 90.9 ± 4.9; 12th week DMV SBP 129.3 ± 1.5; DMV DBP 80.2 ± 1.3; all p < 0.001. Values of 24-hour range had no changes under treatment with enalapril and captopril. Estimation of hyperbaric index (HBI) and chronobiological index (CBI) in this category of AH patients showed significant decline of these values within 12 weeks of monitoring, but by 12th week of treatment degree of decline of HBI and CBI DBP was more significant in enalapril group (HBI DBP: group 1 – from 90.4 ± 14.8 till 12.6 ± 2.5; group 2 - from 71.1 ± 10.2 till 20.4 ± 4.8 9), all p < 0.001; CBI DBP from 44.9 ± 3.8 till 9.0 ± 1.6 (%), from 39.4 ± 3.3 till 13.8 ± 2.5 (%), all p < 0.001. It is important that number of patients with increased HBI DBP > 20% and CBI > 20% was significantly lower in enalapril group (18.2 vs 33.3; 9.1 vs 22.0; all p < 0.05, and values of circadian hypo-amplitude-tension were more beneficial in captopril group (12 vs 0, p < 0.001).

Conclusions: Changes of the main values of BP chronostructure have unidirectional character that shows positive physiological effect of both drugs. Enalapril has more significant impact on circadian rhythm and as a result it has more protective effect of target-organs in the prevention of cardiovascular severities in this group of patients.

AMBULATORY BLOOD PRESSURE VARIABILITY- THE HIGHER THE WORST?

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Objective: Our goal was to establish a normal range for blood pressure variability (BPV) defined by average real variability (ARV) and to assess whether it can be considered as an additional cardiovascular risk factor

Design and method: In contrast to one of our previously published study, which included 110 patients, we selected 80 inefficiently treated hypertensive patient, admitted to County Clinical Hospital Turgu Mures, Romania to adjust hypertensive treatment. The definition of hypertension was based on 24-hour ambulatory BP monitoring (ABPM), by using a validate device (ABPM 05, Meditech Ltd, Hungary®), defined as mean 24-hour BP > 130 and/or > 80 mmHg. After calculating BP variability defined as average real variability (ARV), the median value was used to divide the study population in low (LV) or high variability (HV) group. We compared ABPM derived BP parameters, assessed if there is any correlation between pressure overload and variability.

Results: In both groups awake systolic BP was nearly equal 143.7 ± 10.5 mmHg, versus 142.4 ± 12.2 mmHg, p = 0.89. Nighttime diastolic BP was significantly higher in the in the LV group 74.09 ± 8.33 versus 69.02 ± 10.22 mmHg, p = 0.017. In the LV group pressure overload expressed as percent time elevation (PTE%) of systolic and diastolic values were 75.2 ± 15.6/45.21 ± 29 % vs. 67.51 ± 18.21/36.13 ± 25.61% in the HV group, p < 0.0001. The systolic BP load was 322.2 ± 195.7 mmHgxh vs. 314.6 ± 183.7mmHgxh in the HV group, p < 0.0001. The diastolic BP load was 126.2 ± 112.9 mmHgxh vs. 93.02 ± 101.9 mmHgxh in the HV group, p < 0.0001. No correlation was found between BP variability and systolic PTE or BP load in any of the groups, p > 0.05.

Conclusions: We found that patients with low variability presented higher BP values and greater pressure overload. High variability is not necessary a dangerous phenomenon if it is accompanied by low BP values without pressure overload. To appreciate the real efficacy of the antihypertensive treatment, a comprehensive assessment of BP values, variability and pressure overload parameters should be included.