MANAGEMENT OF HYPERTENSION ACCORDING TO HEMODYNAMIC MODULATORS BY IMPEDANCE CARDIOGRAPHY IS NOT SUPERIOR TO STANDARD CLINICAL CARE IN TREATING NAÏVE HYPERTENSIVE PATIENTS

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Objective: Different hemodynamic profiles have been shown to underlie the process of incident hypertension. Aim of our study was to test the hypothesis that the choice of antihypertensive drugs according to the individual hemodynamic profile of patients might achieve a better control of hypertension than standard clinical care.

Design and method: Longitudinal study in 64 consecutive, treatment-naïve hypertensive patients referred to a Hypertension Unit for study. Standard clinical and laboratory examinations were performed, including ABPM. Impedance cardiography by the HOTMAN® System was used for noninvasive assessment of hemodynamic modulators and evaluation of the hemodynamic status of the patients. 30 patients (46.9%) were randomly assigned to the standard group and treated according to standard clinical care (S-group), while the treatment of the other 34 patients (53.1%) was derived from their hemodynamic profile (H-group). All the patients had a follow-up visit after six months.

Results: No significant differences were found at baseline between the two groups in anthropomorphic variables or office systolic, diastolic BP or 24-h-ABPM: 146/87 and 138/91 mmHg (S-group) vs. 143/85 and 136/88 mmHg (H-group). At follow-up, both groups showed a significant decrease in office and ambulatory BP without significant differences between groups: 128/77 and 123/80 mmHg in the S-group vs. 128/78 and 124/80 mmHg in the H-group. The number of antihypertensive drugs needed was slightly but not significantly higher in the S-group compared to the H-group (1.27 vs. 1.06, $p = 0.17$). Use of diuretics was significantly higher in the H-group (23/3; OR: 18.8, $p < 0.001$), while ACEI (11/3; OR: 4.2, $p = 007$), ARB (17/6; OR: 3.2, $p = 0.001$) and CCB (7/2; OR: 4.0, $p = 0.045$) were significantly more often used in the S-group. Interestingly, the prevalence of the most frequent hemodynamic abnormality in the H-group, intravascular hypervolemia, did not change compared to baseline.

Conclusions: Our study shows that management of debuting hypertensive patients guided by the measurement of hemodynamic modulators was not superior to standard clinical care in controlling hypertension. Future studies are required to test if higher doses and more intensive treatment are needed to achieve targets in hemodynamic abnormalities.

PREDICTORS OF ATRIAL FIBRILLATION PROGRESSION IN HYPERTENSIVE PATIENTS

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Objective: To identify predictors of AF progression in patients with hypertension.

Design and method: The study involved 136 patients (mean age 56,2 ± 4,9 years) followed up prospectively from September 2010 till June 2016. Observations (mean duration of 60 ± 3 months) included regular telephone interviews every 3 months and annual general clinical examination with laboratory and instrumental evaluation. Arrhythmia progression from paroxysmal to permanent form was evaluated.

Results: Cardiovascular complications and AF progression were documented in 63 (46%) patients during the observation period of 60 ± 3 months. According to the results of multifactorial analysis, independent predictors of progression from paroxysmal to permanent AF in hypertensives were left ventricular hypertrophy (OR 1.25, CI 1.03–1.52) and increased arterial stiffness (OR 2.3, CI 1.95–2.65). Pulse wave velocity more than 1106 cm/s in hypertensive patients with paroxysmal AF could predict progression to permanent arrhythmia in the next 5 years (sensitivity 66.6%, specificity 63.8%).

Conclusions: The multifactorial analysis revealed significant impact of left ventricular hypertrophy and increased arterial stiffness on the risk of atrial fibrillation progression from paroxysmal to permanent form. Pulse wave velocity can be considered as a predictor of this progression.

RELATIONSHIP BETWEEN OF LOCAL ARTERIAL STIFFNESS PARAMETERS AND ECHOCARDIOGRAPHIC INDICATORS IN PATIENTS WITH STEMI

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Objective: to evaluate the correlation between local arterial stiffness parameters and echocardiography in patients STEMI younger than 55 years old.

Design and method: the study included 69 STEMI patients aged 35 to 55 years, mean age 47,4 ± 7,1 years, body mass index (BMI) 26,9 ± 3,7 kg/m2, office SBP - 120 (110; 130) mmHg, DBP - 80 (70; 80) mmHg. Inclusion criteria: STEMI confirmed by ECG data, troponin I level, CK-MB, hemodynamically significant stenosis of only one coronary artery (infarct-related) according to coronary angiography, and the absence of previous angina. Ultrasound of the common carotid arteries (CCA) was carried out using RF high-frequency signal technology on the MyLab scanner (Esaote, Italy) at 7–9th day from the disease onset. The following parameters were recorded: intima-media thickness (IMT), local pulse wave velocity (PWV), stiffness indices α and β, coefficient of transverse compliance (CC) and distensibility (DC), augmentation index (Aix). Echocardiography was performed on the MyLab scanner (Esaote, Italy). End-diastolic volume (EDV), end systolic volume (ESV), end-diastolic size (EDS), end-systolic size (ESS), and left ventricular ejection fraction (EF) were analyzed. Patients were received pharmacotherapy for STEMI during the study according to the ESC guidelines.

Results: A statistically significant positive correlation between age and CCA ultrasound parameters was revealed: IMT ($r = 0.25$, $p < 0.05$), PWV ($r = 0.25$, $p < 0.05$), Aix ($r = 0,43$, $p < 0.01$), indices α and β ($r = 0.30$, $p < 0.01$ and $r = 0.29$, $p < 0.01$, respectively), as well as a negative relationship with the coefficients CC and DC ($r = –0.25$, $p < 0.05$ and $r = –0.26$, $p < 0.05$, respectively). An increase of IMT correlated with increase of EDV ($r = 0.24$, $p < 0.05$), ESV ($r = 0.25$, $p < 0.05$) and EDS ($r = 0.28$, $p < 0.05$). The EF was positively related to the coefficients CC and DC ($r = 0.33$, $p < 0.01$ and $r = 0.32$, $p < 0.01$, respectively); negatively with PWV ($r = –0.36$, $p < 0.01$), stiffness indices α and β ($r = –0.37$, $p < 0.01$ and $r = –0.36$, $p < 0.01$, respectively).

Conclusions: An increase of stiffness and loss of elasticity of the CCA, a thickening of intima-media was associated with a deterioration of the structural parameters and left ventricle contractile function in STEMI patients of young and middle age.

EFFECT OF DIFFERENT DOSES OF ATORVASTATIN THERAPY ON CENTRAL PRESSURE PARAMETERS IN STEMI PATIENTS

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Objective: Analyze the central pressure and pulse wave velocity (PWV) in the aorta in patients with STEMI.

Design and method: 85 patients were included in the study: 75 men (88%) and 10 women (12%); the average age 51.9 ± 9.3 years. The main group received atorvastatin 80 mg/day, the comparison group received atorvastatin 20 mg/day. The first group included 46 patients (41 men and 5 women), the average age was 51.2 ± 9.5 years. The second group consisted of 39 people (36 men and 3 women), aged 52.7 ± 8.2 years. The groups were matched by age, sex, height, BMI, office BP.
The central pressure parameters were measured by appllanation tonometry using the SphygmoCor device (AtCorMedical, Australia) at 7–9th day and after 24 weeks: systolic aortic pressure - SBPao, diastolic - DBPao, pulse - PPao. PWV was analyzed in synchronism with the ECG channel using the PWV program in sequential recording of pulse waves from the common carotid and femoral arteries.

Results: Initial levels of SBPao, DBPao and PPao were 101 ± 9.4; 71 (66; 80) and 29.4 ± 6.2 mmHg, respectively, PWV was 8.1 ± 2.1 m/s in the control group. The following parameters have increased after 24 weeks of treatment: SBPao up to 109.1 ± 12.0 (by 7%, $p < 0.05$), PPao up to 34.2 ± 8,1 mmHg. (by 14%, $p < 0.05$). There was no significant decrease in carotid-femoral PWV and DBPao.
Baseline values of SBPao, DBPao, and PPao were 103.9 ± 9.8; 76 (66, 86), and 27.0 (24, 31) mmHg, accordingly, the PWV was 8.6 ± 1.7 m/s in the main group. There was a significant change in the parameters: an increase of SBPao to 109.3 ± 9.9 (by 5%, $p < 0.05$), PPao to 32.9 ± 7.5 (by 18%, $p < 0.05$) mmHg, and decrease of PWV to 7.8 ± 1.5 m/s (by 9%, $p < 0.05$), respectively, after 6 months of treatment.

Conclusions: The baseline and follow-up values of central arterial pressure were in normal range with a significant increase of SBPao and PPao in both groups after 6 moths of therapy. Administration of high-dose atorvastatin was accompanied by a significant improvement in carotid-femoral PWV in patients with STEMI.

ATRIAL FIBRILLATION AND CHRONIC KIDNEY DISEASE ESH-FA PROJECT- DATA ON CROATIAN COHORT

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Objective: Chronic kidney disease (CKD) is well established risk factor for atrial fibrillation (AFib). The aim of the study was to analyze association of CKD and AFib in the consecutive sample of patients with AFib who were admitted to the UHC Zagreb Cardiology Clinic, part of the ESH Excellence centre of hypertension. This cohort is part of the ESH –FA project.

Design and method: Consecutive sample of 201 patients with AFib (115 M, 86 F; averaged age 71.6) was enrolled in period 2014–2016. Data were collected from medical records. BP was measured following the ESH/ESC guidelines. Hypertension (HT) was defined as BP equel or greater than 140/90 mmHg and/or antihypertensive drugs treatment, chronic kidney disease (CKD) was defined as eGFR (CKD Epi < 60 ml/min).

Results: CKD was diagnosed in 52.2% of patients with AFib, and 13.3% were in CKD stage > 3. CKD patients were older than non-CKD (72.2 vs. 68.3). Coronary heart disease, heart failure and known significant valvular disease were more frequently presented in CKD patients (64.4% vs. 47.2%, p = 0.05; 64.4% vs.44.5%, p = 0.02; 38.9% vs.21.6%, p = 0.02, respectively). Prevalence of HT was higher in CKD patients (92.4% vs. 77.1%; p = 0.02), but there were no differences in control of HT between CKD and non-CKD patients. Permanent and persistent AFib were more frequently diagnosed in CKD, while first diagnosed and paroxysmal AFib were more frequently diagnosed in non-CKD patients (p = 0.003). CKD patients had significantly more CHADVASC > 2 than non-CKD patients (90.2% vs. 70%;p = 0.004).

Conclusions: CKD is highly prevalent in patients with AFib and substantial numbers of patients are in advanced CKD stages. Prevalence of HT and CV comorbidity, as well as prevalence of permanent and persistent AFib are much more frequently presented in CKD than in non-CKD patients. Compared to non-CKD patients, CHADVASC was more often above 2 in CKD patients. In general, AFib patients with associated CKD have higher global CV risk as well higher risk for future thromboembolic incidents than non-CKD AFib patients.

NOVEL MARKER OF MYOCARDIAL REMODELING ST2 AND THE INFLUENCE OF ALDOSTERONE ANTAGONIST IN PATIENTS WITH HEART FAILURE CAUSED BY HYPERTENSION AND ISCHEMIC HEART DISEASE

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Objective: ST2 is a protein, member of interleukin1 receptor family, includes 2 isoforms: soluble and membrane-bound receptor form. Soluble ST2 (sST2) is the novel biomarker that displays the severity of cardiac remodeling and myocardial fibrosis is used for risk stratification of heart failure (HF) in hypertensive patients. Mineralocorticoid receptor antagonists (MRAs) have been approved to reduce myocardial remodeling. The aim of the study was to evaluate correlation between myocardial remodeling by measuring sST2 levels and effect of MRAs in patients with HF caused by arterial hypertension with and without underlying ischemic heart disease (IHD).

Design and method: Design and method: We examined 18 patients with severe essential hypertension grade 3 and heart failure NYHA III - IV. Biomarker sST2 levels were measured twice: at the admission and at the discharge. Accordingly to echocardiography all patients had left ventricular hypertrophy and LVEF below 45%. Values of sST2 were measured by ASPECT-PLUS ST2 test. Patients were divided into 2 groups: 1st group of 10 patients severe arterial hypertension and HF with underlying IHD, 2nd group of 8 patients with severe arterial hypertension and HF without IHD.

Results: The study included 11 males and 7 females, mean age 79 years. Average value of sST2 in 1st group at the admission was 112.44 ± 15.71 ng/ml, at the discharge lowered to 42.01 ± 7.32 ng/ml; in 2nd group sST2 was 75.81 ± 9.51 ng/ml and lowered to 48.83 ± 6.42 ng/ml respectively. All patients received treatment with optimal medical therapy (OMT) and MRAs. 1st group have achieved reduction of sST2 values up to 62.64% in average, in 2nd group reduction of sST2 levels were achieved up to 35.59% in average. MRAs on top of OMT decreased sST2 levels and myocardial remodeling more markedly in patients with HF, severe hypertension and IHD.

Conclusions: Conclusion: Considering that sST2 levels predict risk for myocardial remodeling in heart failure, guided therapy with MRAs on top of OMT improves risk reduction in all patients. More prominent and positive effect in prognosis improvement and reverse myocardial remodeling can be observed in patients with arterial hypertension, HF with underlying IHD.

DIAGNOSTIC OF EVA SYNDROME IN PATIENTS WITH CHD MANIFESTED AS STEMI

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Objective: to evaluate the structural and functional arterial properties, and biological age in STEMI patients.

Design and method: the study included 67 patients with CAD manifestation with STEMI aged 35 to 50 years (mean age 41.3 ± 8.2 years). Inclusion criteria was absence of previous angina. The patients were divided into 2 groups. Group 1 included 34 people without history of AH. Group 2 comprised 33 patients with AH. The control group (C) consisted of 28 healthy individuals. The regional arterial stiffness was assessed by volume sphygmography (Fukuda Denshi, Japan) on the following parameters: PWV - pulse wave velocity in the aorta, B-PWV in the predominantly muscular arteries, R/L-PWV in the predominantly elastic arteries, L-/CAVI-1 - cardio-ankle vascular index, R/L-ABI - ankle-brachial index, AI - augmentation index, biological age.

Results: according to volume sphygmography, the smallest values of PWV were registered in control: PWV - 7.1 ± 1.0m/s, B-PWV - 7.3 ± 0.8m/s, R/L-PWV - 10.2 ± 1.8m/s. An increase of the following parameters was found in group 1: PWV - 7.8 (6.5, 8.5)m/s, B-PWV - 8.0 ± 1.3m/s, R/L-PWV - 11.8 ± 1.5m/s. The highest values were diagnosed in group 2: PWV - 8.4 ± 1.2m/s, B-PWV - 8.9 ± 1.2m /s, R/L-PWV - 12.7 (11.9; 13.5)m/s (p1-c,2-c,1–2 < 0.05). The L-/CAVI-1 index was 6.4 ± 0.8 in the C group, in group 1 - 7.4(6.8, 7.5), in group 2 - 8.5 (7.9, 9, 2) (p1-c,2-c,1–2 < 0.05). The lowest AI values were registered in healthy individuals - 0.9 (0.8, 1.0) compared to group 1 - 1.1(0.9, 1.2) and group 2 - 1.1(0.9; 1.3) (p1-c,2-c < 0.05). R/L-ABI prevailed in control group -1.0(0.9, 1.2), intermediate values were revealed in patients without history of AH - 0.8(0.6, 1.0), the smallest in patients with AH - 0.7 (0.5, 1.0) (p1-c,2-c, < 0.05). The differences in biological age were found despite comparability by age: in C group - 40.5 ± 4.1 years, in group 1 - 45.5 ± 9.2 years, in group 2 - 47 (43.53) years (p1-c,2-c < 0.05).

Conclusions: A significant disruption of regional vascular stiffness parameters was found in STEMI patients, more pronounced in those with AH history. Manifestation of CAD with STEMI in young and middle-age subjects is a clinical manifestation of early vascular aging process.

IMPROVEMENT OF SYSTOLIC FUNCTION IN STABLE CORONARY ARTERY DISEASE PATIENTS AFTER REVASCULARISATION

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Objective: Myocardial strain detected by transthoracic echocardiography is a more sensitive method for systolic function evaluation than ejection fraction. Impact of coronary revascularisation on systolic function in stable coronary artery disease (SCAD) patients remains an object of research.

Design and method: 36 SCAD patients with single lesion in left anterior descending artery (LAD) undergoing percutaneous coronary intervention (PCI) were included in a single center prospective cohort study from December 2015 to December 2017. Patients with previous myocardial infarction, coronary vessel occlusions, stents in LAD or left main artery, PCI in previous 3 months time in left circumflex or right coronary artery, atrial fibrillation at the time of study were excluded. In study group there were no patients with medium or pronounced left ventricular hypertrophy, II – IIIrd degree valvular regurgitation, any valve stenosis, hypo- or akinetic segments visually, or decreased ejection fraction. Transthoracic echocardiography at rest was performed the day before PCI and 3 months after. Acquired images were measured by TOMTEC ARENA, using 16-segment model, and results analysed using SPSS 22.

Results: Mean age in the study group was 67 years. Out of 36 patients, 22 (61%) were men. 16 (44%) patients had proximal 1/3 LAD stenosis, 16 (44%) had diastolic dysfunction. Mean GLS before and after the revascularisation was -16.22 ± 1.14% and -19.43 ± 1.35 respectively (delta = 3.21; p < 0.001) and improvement remained statistically significant in each of 16 segments, too. When comparing results in subgroups, delta (change) after revascularisation in proximal LAD group was 3.61% ± 1.79 (p < 0.001) and in middle 1/3 LAD group 2.9% ± 1.33 (p < 0.001). Difference between subgroup results was statistically significant (p = 0.02). Delta in normal diastolic function group and diastolic dysfunction group was 3.18 ± 1.89 (p < 0.001) and 3.26 ± 1.09 (p < 0.001) respectively, and difference between subgroups was not statistically significant.

Conclusions: In this small prospective cohort study PCI in SCAD patients was associated with statistically significant LV myocardial strain improvement.