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THE PROGNOSTIC VALUE OF ARTERIAL HYPERTENSION AND TYPE 2 DIABETES MELLITUS IN CARDIAC REMODELING AND FORMATION ARRYTHMIAS

Bilovol A.N., Bobronnikova L.R., Ilchenko I.A., Shaposhnikova Yu.N.
Kharkiv National Medical University, Kharkiv,Ukraine

The combination of arterial hypertension (AH) and diabetes mellitus (DM) increases their adverse effects on the cardiovascular (CV) system, heightens the risk of development of both macrovascular complications - stroke, myocardial infarction, sudden death, atherosclerotic peripheral vascular disease and microvascular lesions - retinopathy, nephropathy and neuropathy [4]. The clinical course of AH and DM has several peculiarities, that are manifested by increased pulse pressure (PP) due to increased stiffness of arteries of medium and large diameter, which is a predictor of poor prognosis. It is proven, that the elevation of PP by 10 mm Hg correlates with an increase of mortality by 20% [3]. An amendment of the geometrical model of the heart occurs in case of increased blood pressure (BP), as well as in the presence of DM. An enlargement of left ventricle (LV) is observed in patients with type 2 DM (DM-2), even in the absence of hypertension, due to hypertrophy of cardiomyocytes and the growth of interstitial component. In case of combined course of DM-2 and AH, the addition of hemodynamic factor leads to remodeling of the LV [2]. In case of LV hypertrophy (LVH) an increase of myocardial mass (MM) develops, which first appears as a compensatory response to raised BP and helps to maintain the systolic function of the heart and to normalize the intramyocardial tension. In the future, compensatory LVH loses meaning and becomes an important independent risk factor for CV events, which increments in proportion to the degree of MM increas [1]. AH creates the set of hemodynamic and non-hemodynamic factors that contribute to cardiac remodeling (CR), which, depending on the relative wall thickness (RWT) and MM index is classified into 4 types: normal heart model (NHM), excentric LV hypertrophy (ELVH), concentric LV hypertrophy (CLVH) and concentric LV remodeling (CLVR). ELVH and CLVH belong to hypertrophic type of CR, while CLVR belongs to non-hypertrophic one accordingly [2].

The purpose of the study was to determine the influence of AH and DM-2 on amendment of the geometric model of the heart and the development of arrhythmias.

Materials and methods. A total of 64 patients were examined (mean age 58,6±4,3 years, 35 women and 29 men) with AH of 2-3 degrees and DM-2 in the stage of subcompensation. Mean duration of AH was 9,3±3,4 years, mean duration of DM-2 -5,4±1,6 years, mean body mass index (BMI) of patients – 27,2±2,5 kg/m². The examination program included the assessment of carbohydrate metabolism (blood glucose fluctuations throughout the day by automatic analyzer Chem Well); glycosylated hemoglobin (HbA1c) by chromatography; echocardiography (Toshiba appliance - SSH - 60 A (Japan)) according to standard procedures in the M and B modes; 24-hour Holter monitoring - cardiac monitoring system "Rhythm" (Ukraine); ambulatory BP monitoring (ABPM) by "Meditech" recorder (Hungary). Statistical analysis was performed by the instrumentality of MS Excel v 7.0, with the minimum accepted level of significance $p < 0.05$. The data obtained were compared with the results of a survey of 14 healthy volunteers, which formed the control group (7 men and 7 women, mean age – 46,4±2,6 years).

Results. Patients were divided into 3 groups according to nosologic units, and were representative by gender and age: 1 group - 22 patients with AH (11 of them women); 2 group - 21 patients with DM-2 (10 of them women); 3 group - 21 patients with AH and DM-2 (12 of them women). Geometric model of the LV was assessed by RWT and MM index. When MM index < data of the control group and RWT < 0,45 - evaluated as NHM; when MM index > data of the control group and RWT < 0,45 - as ELVH; when MM index > data of the control group and RWT > 0,45 - as CLVH; when MM index < control and RWT > 0.45 - as CLVR [1]. LVH was diagnosed at MM rates greater than or equal to 125 g/m² for men and 110 g/m² for women [2]. The survey revealed changes of the geometric model of the heart, which were different in each group of patients. CLVH was found in the majority of patients in 1 group (51%): MM index: 128,4±10,6 g/m; control group - 69,4±5,2 g/m; $p<0,05$; RWT: 0,51±0,04 conventional units (CU); control – 0,42±0,03 CU ($p<0,05$). ELVH was found in 22 % of patients, CLVR - in 16% of patients, NM was detected only in 11 % of patients. CLVR predominated among patients of 2 group (58%): MM index: 76,3±4,2 g/m; RWT: 0,49±0,05 CU ($p<0,05$). 15% of patients had CLVH, 13% - ELVH and 14% - NM of the heart. As concerns 3 group, majority of patients had CLVH (64%): MM index 131,3±4,8 g/m; RWT 0,52±0,05 CU ($p<0,05$). Other types of remodeling were recorded less frequently in this group: CLVR (12%), ELVH (17%) and NM of the heart (7%).

The analysis of ABPM parameters allowed us to determine the changes of circadian rhythm of BP in all groups of patients: "dipper" type was found in groups 1, 2 and 3: 17%, 39% and 10% respectively; "non-dipper" type - 56%, 36% and 58% respectively; "night-peaker" type - 27%, 25% and 32% of patients, respectively.

When comparing the data of ABPM and echocardiography it was noted that patients with inadequate nocturnal BP reduction (non-dipper) and with nocturnal BP increase (night-peaker) have enlarged LV cavity and increased MM index. When analyzing the data of 24-hour Holter monitoring we found that patients with AH are significantly more likely to have cardiac abnormalities that were felt by patients (72%), whereas 43% of patients with DM-2 showed no clinical signs of arrhythmias, which were detected only by additional research. Statistically significant ventricular arrhythmias (VA) were significantly more often ($p<0,05$) observed in patients with AH: ventricular ectopic beats (VEB) and paroxysms of ventricular tachycardia (VT) (in the 1st, 2nd and 3rd groups VEB: 12% 7% and 17% respectively; VT:5 %, 1% and 6% respectively). At the same time, patients with DM-2 significantly more often ($p<0,05$) had supraventricular arrhythmias — atrial premature beats (APB) (in the 1st, 2nd and 3rd groups: 19%, 72 % and 27%, respectively) and paroxysmal atrial fibrillation (AFpar) (in the 1st, 2nd and 3rd groups: 7%, 24 % and 11%, respectively). As concerns control group, only 2 people were observed to have isolated atrial extrasystoles during daylight hours.

A detailed analysis of VA was performed in examined patients, since VA are accompanied by more significant hemodynamic disorders and are predictors of sudden CV death. Particular attention was paid to the high-grade VA - paired VEB and paroxysms of VT of any duration. VEB were recorded very rarely in patients in the control group (only 2 patients - 14%) and were represented by single monomorphic VEB no more than 6 per day, which were recorded in the afternoon hours (12:00 pm – 16:00 pm). At the same time, VA occurred much more frequently in patients with AH and DM-2. VEB were evaluated according to the classification of B. Lown, M. Wolf and M. Ryan. The high grade VEB were observed mainly in hypertrophic types of LV remodeling in examined patients (in the 1st, 2nd and 3rd groups: 3rd class by Lown's grade - 15%, 7% and 19%, respectively; 4th class by Lown's grade - 12%, 4% and 14%, respectively; 5th class by Lown's grade — 8%, 1% and 10%, respectively).

Conclusions: Hemodynamic and metabolic disorders that occur in patients with AH and DM-2, contribute to a change in the geometric model of the LV. AH influences the development of hypertrophic types of remodeling greater than isolated metabolic disorders do. VA predominate in patients with hypertrophic types of LV remodeling, whereas supraventricular arrhythmias are more often recorded in patients with non-hypertrophic types. The combination of AH and DM-2 leads to the formation and progression of CLVH, increases the risk of VA, as well as the occurrence of supraventricular arrhythmias, including AFpar.

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EFFICACY OF COMBINATION LIPID-LOWERING THERAPY IN PATIENTS AFTER CORONARY ARTERY REVASCULIRISATION

Elmurodov S.I., Alyavi A.L., Jabbarov A.A.

Tashkent Medical Academy, Cardiology, Tashkent, Uzbekistan

Introduction: Dyslipidemia management situation in patients with high risk and very high risk has been demonstrated very low, despite the wide use of statins[1]. The effects and safety of the combined treatment of ezetimibe (EZ) and statins in patients after coronary artery revasculirisation remain unknown[2]. Randomized studies have demonstrated improved attainment of target low-density lipoprotein cholesterol (LDL-C) values when ezetimibe is combined with statins for the treatment of hypercholesterolemia[3]. However, the efficacy of an intervention in randomized controlled clinical studies may not correlate with its efficacy in a real-world (community practice) setting. Data to support the LDL-C lowering efficacy of ezetimibe/simvastatin (EZE/SMV) outside of controlled clinical studies are currently lacking[4].

Purpose of the study: On the basis of a comprehensive examination of patients will be studied the effectiveness of combination lipid-lowering therapy after coronary artery stenting in patients with coronary heart disease.

Materials and methods: Patients after coronary artery revasculirisation were divided into the statins group (rosuvastain 10 mg/d, atorvastatin 20 mg/d simvastatin 20 mg/d and pravastatin 20 mg/d) (n = 50) and the combination group of EZ(10 mg/d) and statins (rosuvastain 10 mg/d, atorvastatin 20 mg/d simvastatin 20 mg/d and pravastatin 20 mg/d) (n = 54). In order to evaluate the clinical effects on lipids-lowering, systemic inflammation response and clinical safety, the follow-up of all patients was carried out at day 10th and 30th after treatment.

Results: The level of low-density lipoprotein cholesterol (LDL-C) in combination group and statins group was 1.86 ± 0.41 and 2.20 ± 0.61 mmol/L at day 10th, 1.52 ± 0.30 and 1.93 ± 0.48 mmol/L at day 30th, respectively. The control rates of LDL-C level in the combination group and the statins group were 77% and 45% at day 30th, respectively. There was no significant improvement on high-density lipoprotein cholesterol (HDL-C) level during follow-up. The triglyceride (TG) levels were significantly reduced in both groups, while no obvious difference was observed between two groups. No significant difference on serum high-sensitivity C-reactive protein (hs-CRP) level between two groups was observed. Moreover, we did not observe any significant correlation between serum lipids levels and serum hs-CRP level during follow-up. The liver dysfunction and muscle related side effects (MRSE), creatine kinase (CK) and myopathy were not observed in both groups.

Conclusion: Our study demonstrated that it is feasible to initiate combination therapy in patients after coronary artery revasculirisation, which can bring more significant effect on LDL-C-lowering and improve the control rate of LDL-C level with good safety.

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