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Risk Factors for Remodeling of the Left Ventricle of the Heart in Stable Angina Pectoris

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Abstract: In the article, the author studied the risk factors and the odds ratio in hypertensive disease (HD) and coronary heart disease (CHD), which constitute cardiovascular syntropy. The study of the influence of the above risk factors on the course of coronary artery disease and hypertension, as well as the development of cardiac restructuring as a complication indicates the need to develop a program for stratification of the risk of heart remodeling in middle-aged people.

Keywords: cardiovascular diseases, coronary heart disease, arterial hypertension, risk factors.

INTRODUCTION.

Coronary heart disease (CHD), as a multifactorial disease, attracts special attention of specialists of the widest profile, in addition to cardiologists, for whom this problem is one of the most global [1]. In most epidemiological studies, it has been convincingly proven that an increase in the number of risk factors significantly increases the risk of developing coronary heart disease among people with its absence at the time of examination, and also leads to a significant increase in the frequency of fatal and non-fatal complications in people with an already established diagnosis of coronary heart disease [2].

Risk factors for the formation of CHD are important, depending on age and gender in the population. Currently, it has been established that the pathogenesis of most CHD and metabolic diseases, such as dyslipidemia, hypertension, coronary artery disease, angina pectoris, diabetes mellitus, obesity, is associated with systemic inflammation and oxidative stress. It is assumed that these pathological processes in these diseases have common pathogenetic links [3].

The purpose of the study: to determine informative immunological indicators of coronary heart disease and hypertension.

Materials and methods of research:

The study included 234 middle-aged patients with an average age of 52.4±1.27 years.

Arterial hypertension (AH) was verified according to the requirements of the World Health Organization (WHO), classified according to the International Classification of Diseases (ICD-10).

At the same time, they adhered to the ACC/AHA Hypertension Guidelines classification (2017).

The inclusion criteria were patients aged 45 to 59 years with a diagnosis of hypertension (HD), coronary heart disease, stable angina pectoris (SAP) confirmed by clinical and laboratory-instrumental methods, hospitalized in a hospital.

The patients of the study groups were comparable in age, gender, and the presence of CVD risk factors.

The exclusion criteria from the study were patients with acute myocardial infarction, acute coronary syndrome, acute infectious diseases, myocarditis and cardiomyopathies, chronic renal and hepatic insufficiency, pulmonary hypertension, congenital and acquired heart defects, systemic diseases, oncological and hematological diseases.

The research was carried out in accordance with the Helsinki Declaration.

The distribution of patients into groups for the study was carried out as follows:

- group 1 included 64 patients with hypertension (HD) stage 1, grade 1, risk II;
- 52 patients with ischemic heart disease (CHD) were included in group 2: stable angina pectoris (SAP), functional class II (FC), stage 2 HD, grade 2, risk III;
- Group 3 consisted of 58 patients with coronary heart disease: SAP, III FC, HD 3-stage, 3-degree, risk IV;
- the control group consisted of 60 practically healthy individuals without cardiovascular pathology, all patients along with the necessary functional (ECG, ECHOCG, coronary angiography, ultrasound of the abdominal cavity, chest radiography. A laboratory study was conducted to study the protein, lipid and carbohydrate spectrum of blood, coagulogram, cytokines and growth factors in blood serum.

Statistical processing of the results was carried out using Excel programs from the Microsoft Office XP application package (Microsoft, USA).

Results and their discussion.

In order to differentiate the risk of cardiac remodeling and assess the factors contributing to the formation of hypertension and its transformation into coronary artery disease, the leading pathogenesis-related causes and contributing to the formation of hypertension and its transformation into coronary artery disease were identified. The study of the presence of certain factors was carried out comparatively depending on the gender and severity of hypertension and coronary heart disease by carefully studying the anamnesis, objective examination and examination of selected patients.

Lifestyle, field of activity, type of physique, nature of nutrition and hereditary burden of cardiovascular pathology were studied as the leading causal factors of the development of CVD.

As a result, the frequency of certain factors and the odds ratio (OR) of the risk of heart remodeling in patients with cardiovascular diseases were established (Table 1):

Table 1 Risk factors and odds ratio of heart remodeling (M±m)

Risk factors	Patients (n=174)		Control group (n=60)		OR	95% CI (min-max)
	abs	%	abs	%		
Sedentary lifestyle	42	24,2	11	18,3	1,4	0,65-3,09
Alcohol consumption	48	27,6	14	23,3	1,25	0,61-2,58
Smoking tobacco	40	22,9	7	11,7	1,9	0,98-3,75
Smoking nasvaya	16	9,5	2	3,4	3,0	0,65-14,18
Overweight	61	35,4	49	81,7	1,2	0,06-0,26
Fatness	53	45,7	3	5,0	16,0	4,73-53,99
Excessive consumption of table salt with food	61	52,6	7	11,7	8,4	3,52-20,01
Stress and mental fatigue (load)	88	75,8	11	18,3	14,0	6,42-30,54
Hereditary predisposition	98	56,1	17	28,3	3,2	1,65-6,30
Hypersthenic body type	64	36,8	18	30	1,4	0,72-2,70

Excessive consumption of fatty foods and table salt	70	60,4	13	21,7	5,5	2,68-11,28
Leukocytes x109 <4.0 >9.0g/l	71	61,2	7	11,7	11,9	4,99-28,58
ESR>12 mm/h	32	27,6	7	11,7	2,9	1,19-7,00
Fibrinogen>3.5 g/l	46	39,6	12	20,0	2,6	1,26-5,48
Total protein <60.0 g/l	29	25,0	11	18,3	1,5	0,68-3,23
Urea> 9.0 mmol/l	87	75,0	21	35,0	5,6	2,83-10,96
Creatinine>100 mmol/l	93	80,2	9	15,0	22,9	9,86-53,23
PCT >0.05 ng/ml	48	41,4	11	18,3	3,1	1,48-6,66
IGF-I >95.0 ng/ml	67	57,7	9	15,0	7,7	3,49-17,22
VEGF>92.5 pg/ml	87	75,0	27	45,0	3,7	1,89-7,09
TGF-β1>10.0pg/ml	91	78,4	22	36,7	6,3	3,16-12,49
Glucose >5.5 g/l	33	28,4	12	20,0	1,6	0,75-3,37
Total cholesterol >5.5 mmol/l	77	66,4	28	46,7	2,3	1,19-4,27
LDL <2.5 mmol/l	55	47,4	12	20,0	3,6	1,74-7,48
HDL>1,7 mmol/l	54	46,5	8	13,4	5,7	2,47-12,97
TG>1.3 mmol/l	42	36,2	3	5,0	10,8	3,18-36,57
	63	54,3	12	20,0	4,78	2,29-9,87
News atherogenicity index >2.0 conl.units	42	36,2	21	35,0	1,1	0,55-2,02
Progesterone >0.5 nmol/l	23	19,8	11	18,3	1,1	0,49-2,45
Testosterone <31.0 in men;	49	42,3	9	15,0	4,1	1,87-9,21
<1.2 in women (nmol/l)	88	50,8	13	21,7	3,7	1,83-7,64
IL-6, pg/ml	94	54,3	4	6,7	16,6	5,66-48,92
TNF-α,pg/ml	32	18,4	0	0	6,5	1,22-5,29
ECG: High RV5-6, Deep S V1-2	88	50,6	4	6,7	9,6	1,34-5,11
Shortness of breath at rest	118	68,1	17	28,3	5,4	2,73-10,70

Calculation according to the program: at OR > 1, the factor contributes to the onset of the outcome, in our studies gives a forecast of the development of cardiac remodeling.

For example, in patients with obesity and a high R wave in leads V5-6, a deep S wave in leads V1-2 (on ECG), the risk of heart remodeling increases by 16.0 times; with emotional stress and/or mental overstrain, the OR is 14.0; with a shift in the number of peripheral blood leukocytes <4.0 and >9.0 g/l OR is 12.0 respectively.

The development and implementation of a risk stratification program for cardiac remodeling into cardiological and terpavetic practice contributes to increasing efficiency in choosing management tactics for patients with CVD and helps to reduce the risk of complications and disabilities.

Based on the calculation of the OR of the studied risk factors, the absence of a link between overweight and changes in the balance of progesterones and testosterone in the blood serum with the development of cardiac remodeling, the OR of which is 0.123 and 1.1, respectively, was established.

Sedentary lifestyle as a risk factor occurs in patients with coronary heart disease: SSN +AH in 42 (24.2%), and in the control group - in 11 (18.3%) cases, which shows the relationship of this factor with an increase in the chance of developing cardiac remodeling by 1.42 times.

Thus, when studying the influence of risk factors on the development of cardiac remodeling in CHD and GB in patients, it was found that with an increase in the level of creatinine in the blood of patients with CHD, the chance of cardiac remodeling increases by 23.0 times, when a high R wave in leads V5-6, a deep S wave in ECG in obese patients is detected leads V1-2 by 16.0 times; under stress and /or mental stress by 16.0 times, with a shift of peripheral blood leukocytes <4.0 and >9.0 g /l by 11.0 times.

It is important to indicate the effect of changes in the blood lipid spectrum on the formation of cardiac remodeling, in particular in patients with coronary heart disease, an increase in TG >1.3 mmol/ l increases the chance of cardiac remolation by 10.7 times. At the same time, peripheral blood leukocytes act as an indicator of inflammation in coronary heart disease, a decrease of which < 4.0 and / or an increase of > 9.0 thousand per ml indicates an increase in the chances of remodeling development by 12 times.

Hypersthenic body type, which is an unmodifiable risk factor, was observed in 64 (36.8%) in the main group, and in 18 (30%) in the control group. This factor had an almost similar frequency among patients and healthy with OR = 1.4.

When studying bad habits, regional features that differ from the data of foreign researchers were also identified. 40 people (22.9%) were smokers in the main group, 7 (11.7%) in the control group. The total duration of tobacco smoking in patients was on average 8.4 ± 1.2 years. During the survey, it was also found out that 11 (27.5%) patients quit smoking after the diagnosis of coronary heart disease and GB, however, a sufficiently long period of the presence of this risk factor does not exclude its causal relationship with the formation of the disease. A regional feature of bad habits was that smoking nasvaya had a high OR = 3.0. At the same time, in the main group – in 16 (9.5%), in the control group – in 2 (3.4%), although in our opinion this frequency during the survey may not be entirely reliable, since patients often tend to hide their bad habits.

Alcohol consumption was observed in 48 (27.6%) patients in the main group and 14 (23.3%) in the control group, which indicates a high prevalence of bad habits, both among patients and among healthy (OR=1.25). This phenomenon indicates that it is impossible to identify the harmful effects of alcohol by one survey, it is also necessary to assess the frequency and duration of the factor's effects.

According to the nature of the patients' diet, 2 main risk factors were identified, these are excessive consumption of fatty foods and table salt. In the main group, 70 patients (60.4%) indicated the presence of this factor (OR =5.5).

Taking into account the above, we also studied the levels of sex hormones in men and women with cardiovascular syntropia. In women, a decrease in progesterone levels of less than 0.5 nmol/l, regardless of the phase of the menstrual cycle and an increase in testosterone levels of more than 1.2 nmol/l, and in men, a decrease in testosterone levels of less than 31.0 nmol/l were considered as risk factors and were observed in 65 (37.4%) patients.

Thus, the study of the influence of the above risk factors on the course of coronary heart disease and hypertension, as well as the development of cardiac restructuring as a complication, indicates the need to develop a program for stratifying the risk of heart remodeling in middle-aged people. The implementation of the heart remodeling risk stratification program in the practical activities of medical institutions contributes to increasing efficiency in choosing tactics for managing patients with CVD and helps to reduce the risk of complications and disabilities.

Conclusion

It was found that with an increase in the level of creatinine in the blood of patients with coronary heart disease, the relative chance (OR) of heart remodeling is 23.0, with obesity and the presence of a high R wave in leads V5-6, a deep S wave in leads V1-2, the chance of remodeling increases 16-fold; with stress and/or mental stress OR is equal to 14.0, with a shift of peripheral blood leukocytes <4.0 and >9.0 g / l, OR is equal to 11.0, with an increase in blood triglycerides > 1.3 mmol / l, the chance of cardiac remolation increases by 10.7 times.

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