RISK FACTORS AND PREDICTION OF MIOCARDIAL INFARCTION IN MALES OF DIFFERENT AGE

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Abstract: To conduct complex evaluation of MI risk factors in men taking their agespecific qualities, and to invent prediction calculator of MI based upon the data obtained.Totally, 12 males with Q and non-Q MI included, at the age 45-74 y. o., mean age — 58,9±0,6 y. o. In all patients we assessed clinical and anamnestic data, parameters of lipid, carbohydrate metabolism, sex hormones levels, CRP, levels of hypodynamia, depression and anxiety via questionnaires.To predict the risk of MI with statistical methods, a calculator was invented, which make it to estimate the probability of MI development in a patient taken their age-specific risks.

Key words: cardiology, ischemic heart disease, myocardial infarction, risk factors, insulin resistance, dyslipidemia.

Introduction: In the global patient population, cardiovascular diseases (CVD) account for almost half of all noncommunicable diseases [1]. According to the American Heart Association, CVD deaths will reach 3.6 million people by 2030 [2]. In Uzbekistan, despite the downward trend in morbidity and mortality from CVD against the background of improved treatment and prevention measures, which can be traced from 2021, the total number of patients with circulatory system pathology reaches 2.8 million people, and the proportion of patients with coronary heart disease (CHD) is about 1.4 million [1]. Based on the results of the independent registry of acute coronary syndromes RECORD, it is shown that the mortality rate from myocardial infarction (MI) in our country reaches 13.2%, while the same indicator in developed countries of Europe and the United States is much lower and is at the level of 6-8% [1].

According to current data, the decrease in mortality from MI in recent years in men, especially those of working age, occurs to a lesser extent than in women of the same age group [3]. Maintaining a high level of morbidity and mortality in Uzbekistan from CVD, including among the male population, is largely due to insufficient influence on the main risk factors for CHD and MI, which are: smoking, unhealthy diet, low physical activity and psychosomatic risk factors, arterial hypertension (AH), carbohydrate metabolism disorders, including sugar factory diabetes (DM), as well as lipid metabolism disorders and obesity [1]. A detailed study of the risk factors associated with the development of MI in men allows us to identify their age characteristics. The creation of a calculator for predicting the development of MI, taking into account the age characteristics of risk factors in men, is relevant for the possibility of identifying risk groups during professional examinations, medical examinations, and primary therapeutic examinations for further application of a differentiated and individual approach to MI prevention.

The aim of the study was to conduct a comprehensive assessment of the risk factors for MI in men, highlighting their age characteristics, and, based on the data obtained, to develop a calculator for predicting the risk of MI in a particular patient.

Material and methods: The study included 12 men with Q and non-Q wave MI aged 45-74 years, mean age-58.9±0.6 years. Patients were divided into 2 groups depending on their age (middle and elderly). The first group consisted of 6 men aged 45-59 years (mean age — 53.9±0.5 years), the second — 4 men aged 60-74 years (mean age — 66.2±0.8 years). The control group included 2 men without proven coronary artery disease, aged 45-74 years, the average age was 57.1±1.2 years (Table 1).

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Conducting a study of the Andijan Medical Institute. All patients signed the informed consent form prior to inclusion in the study. The study did not include patients with type 1 diabetes mellitus, insulin-dependent type 2 diabetes, autoimmune, acute infectious, oncological diseases, decompensated thyroid diseases, and severe renal and hepatic dysfunction. All men underwent laboratory tests to determine the parameters of lipid and carbohydrate metabolism, assess the level of insulin and calculate the glycemic index. HOMA-IR index, C-reactive protein (CRP) levels, and testosterone levels. MI was diagnosed on the basis of the third universal definition of myocardial infarction according to the recommendations of the European Society of Cardiology [4]. To determine the level of anxiety and depression, the HADS questionnaire was used; using a questionnaire developed on the basis of the Andijan State Institute

Table 1

General characteristics of the studied patients

Patient groups, n	Age
1. Middle-aged men, n=6	53.9±0.5 years
2. Elderly men, n=4	,2±0.8 years
3. Control group, n=2	57.1±1.2 years

the level of inactivity was assessed. Statistical processing of the obtained results was carried out using the Statistica 6.1 program. To assess the type of feature distribution, kurtosis and skewness indicators were used, which characterize the shape of the distribution curve. Values of qualitative attributes

they are represented as observed frequencies and percentages. In cases of normal distribution, as well as equality of sample variances, the Student's t-test was used to compare the samples.

In the case of distributions that do not correspond to the normal law, as well as in the case of inequality of variances, nonparametric U-criteria were used

Mann-Whitney and Wilcoxon's T-test. To compare the frequencies of qualitative features, we used the criterion $\chi 2$.Univariate and multivariate logistic regression analysis was used to identify predictors of MI development. Level

When testing the null hypothesis, the corresponding $p<0.05$ was assumed to be of statistical significance. When comparing several groups, the Bonferroni correction for multiple comparisons was used; data processing and graphical representation were performed using computer programs, including Excel 2007.

Results and discussion: It is well known that more than 40% of all CVD cases are related to smoking [1]. In addition, for middle-aged men, smoking increases the risk of sudden cardiac death by 2-3 times compared to non-smokers in this age group [4]. Among the hospitalized men, 90 (80.4%) patients were smokers; among middle —aged men, smoking was detected in 54 (81.8%) patients, among the elderly-in 36 (78.3%), p=0.8 (Table 2). Smoking was a significant risk factor for MI for the men we examined, especially among middle-aged people age that emphasizes the importance of correcting this risk factor.

Overweight and obesity are independent predictors of MI, and it is important to emphasize that it is the abdominal type of obesity that is a significant predictor of sudden cardiovascular events and a marker of earlier development of stenotic atherosclerotic coronary artery disease [5, 6]. The

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influence of obesity and overweight on the risk of MI in men significantly increases due to more complex control in this group

patients with risk factors such as hypertension, dyslipidemia, hyperglycemia, and microalbuminuria [7].

In the group of middle-aged men, the body mass index (BMI) index was 26.6±0.4 kg; 28 (42.4%) patients with overweight prevailed, 16 (24.2%) patients with obesity of I and II degrees of severity. Among middle-aged men with obesity, 10 (62.5%) patients had abdominal type. In elderly men, the BMI index was 27.2±0.6 kg (p=0.4); 17 (36.9%) overweight patients also prevailed, 14 (30.4%) patients were diagnosed with grade I obesity, and there were no patients with grade II and III obesity among the second group of patients. Fatness according to the abdominal type. It was detected in 9 (60%) elderly men (Table 2). Based on our data, it was shown that overweight individuals predominate among men with MI. Taking into account the increasing prevalence of overweight and obesity, including abdominal obesity, in men over the past decades, it is difficult to overestimate the importance of measures aimed at normalizing body weight in order to reduce the incidence and mortality of the population from CHD in general and MI in particular.

Burdened heredity as a risk factor for MI was detected among middle-aged men

in 6 (9.1%) patients, and among the elderly-in 7 (15.2%), (p=0.03), which generally indicates a significant role of burdened heredity in the male population (Table 2).

It is known that high blood pressure (especially uncontrolled hypertension) contributes to the formation and progression of CVD and increases the risk of MI in men [2]. According to modern researchers, hypertension preceding a myocardial infarction will contribute to a more frequent development of a complicated course of MI with the formation of left ventricular dysfunction, heart failure, and an increase in the frequency of fatal outcomes [8]. Among middle-aged men, hypertension was detected in 40 (60.6%) patients, most of them — grade 1 hypertension-30 (75%), uncontrolled course of hypertension (grade 2 and 3 hypertension with unstable course) — in 10 patients. Among elderly men, hypertension was detected in 40 examined patients (87%, p=0.005), which indicates an increase in the number of patients with hypertension with age; uncontrolled hypertension was diagnosed in 18 (45%), elderly men with MI, p=0.1 (Table 2).

Thus, among the examined men, patients with grade 1 hypertension prevailed — 62 (86.1%), but among the elderly, more people with grade 2 and 3 hypertension and its uncontrolled course were identified.

Rational and timely antihypertensive therapy is a necessary link in the primary and secondary prevention of MI in men in each age group. It is known that disorders of carbohydrate metabolism, including type 2 diabetes, are one of the key factors in the development and progression of CVD, including MI [9]. Carbohydrate metabolism disorders were detected in 21 out of 112 (18.8%) men with MI; carbohydrate tolerance disorder (HTG)

It was diagnosed in 2 (3%) middle-aged and 4 (8.7%) elderly patients, p=0.4. Type 2 diabetes mellitus was detected in 7 (10.6%) middle-aged men and 8 (17.4%) elderly men, p=0.4 (Table 2). Fasting glucose level It was 5.1±0.1 mmol/L in middle-aged men and 5.6±0.2 mmol/L in the elderly (p=0.03) (Table 3).

The presence of insulin resistance is an important universally recognized cardiovascular factor.-risk factor that increases the likelihood of developing

Table 3

Indicators of carbohydrate and lipid metabolism in the examined patients

	Middle-aged men, n=6	Elderly men, n=4	r

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Fasting blood glucose, mmol / l	5,1±0,1	5,6±0,2	0,03
Insulin level, UME / ml	13,9±1,9	12,9±1,6	0,7
HOMO-IR, mcED / ml	3,1±0,5	3,4±0,5	0,2
OH, mmol / L	4,4±0, 1	4,7±0,1	0,2
LDL, mmol / l	2,5±0,1	2,8±0,1	0,1
HDL, mmol / l	0,96±0,03	1,03±0,1	0,1
TG, mmol / l	1,7±0,10	1,7±0,1	0,2

Table 4

Psychosomatic status and level of inactivity in the examined patients

	Middle-aged men	Older men	r
Physical inactivity	40 (60,6%)	36 (78,3%)	0,08
Anxiety	13 (19,7%)	6 (13%)	0,5
Depression	5 (7,6%)	8 (17,4%)	0,2

MI complications and the risk of recurrent cardiovascular events [10]. Insulin resistance was diagnosed in 3 (26.8%) examined men, and in the middle — aged group-in 1 (27.3%) patients, in the elderly group — in 1 (26.1%), (p=0.9), (Table 2). The average level of insulin among middle-aged men was 13.9±1.9 MIUin the elderly-12.9±1.6 mem/ml, (p=0.7). In middle-aged men, the index of insulin resistance (HOMO-IR) was 3.1±0.5 meED / ml, in elderly patients-3.4±0.5 meED/ml, (p=0.2), (Table 3).

Thus, in the male population studied, disorders of carbohydrate metabolism, mainly due to the development of insulin resistance, are one of the important risk factors for MI. Control of carbohydrate metabolism, prevention of the development of HTG and diabetes mellitus, diet and hypoglycemic therapy are necessary as preventive measures of MI for middle-aged and elderly men. It is known that at least 39% of the general population of patients have an elevated level of CCH [2]. Timely reduction of blood lipids contributes to the prevention of sudden cardiovascular events. events [11]. Lipid metabolism disorders were detected in 7 (86.4%) middle-aged men and in 4 (91.3%) elderly patients (p=0.9), which indicates a high prevalence of dyslipidemia among men both in middle and old age (Table 2). Lipid metabolism disorders in the examined patients are mainly represented by an increase in LDL levels up to 2.5±0.1 mmol / l in middle age, and up to 2.8±0.1 mmol/L in the elderly (p=0.1), (Table 3).

Thus, lipid metabolism disorders are common in men of every age group, and they are mostly represented by an increase in LDL levels. Changes in the level of sex hormones have an important impact on the development and progression of CHD in the general population of patients. A decrease in testosterone levels contributes to the deterioration of the lipid profile in men, the progression of atherosclerosis, an increase in blood pressure, and the development of endothelial dysfunction, which, in turn, affects the rate of progression IHD and, as a result, increases the risk of developing MI [12].

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The level of testosterone in middle-aged and elderly men was within the normal range and amounted to 12.6±0.8 nmol/l and 12.9±0.9 nmol/l for middle-aged and elderly people, respectively, p=0.8.

In recent years, modern domestic and foreign researchers have paid much attention to studying the role of inactivity and psychosocial risk factors in connection with myocardial infarction [13]. In the middle-aged group, hypodynamia was detected in 4 (60.6%) patients, among the elderly — in 3 (78.3%) patients; the level of hypodynamia was slightly higher in patients of the second group (p=0.08), which indicates a regular increase in the level of hypodynamia in men with age. Among men hospitalized with MI,

depression was detected in 5 (7.6%) middle-aged patients and in 8 (17.4%) elderly patients, p=0.2. An increased level of anxiety was found in 3 (19.7%) middle-aged men and in 6 (13%)middle-aged men elderly people, p=0.5, (Table 4).

The control group consisted of 34 middle-aged and elderly men without proven coronary artery disease. The majority of patients in the control group were diagnosed with AH-28 (77.8%). CHD-related heredity was detected in 14 (41.2%) individuals when analyzing their life history. 7 (67.6%) men of this group were smokers. The mean body mass index (BMI) in the control group was 28.3±0.8 kg/m2. There were 11 (32.4%) overweight patients among the examined individuals, 4 (38.2%) with varying degrees of obesity, most of whom were diagnosed with grade I obesity — 9 (76,9%). Among men in the control group with obesity, abdominal type of the latter was detected in 6 (46.1%). Carbohydrate metabolism disorders were diagnosed in 5 (14.7%) patients,

Of these, HTG was diagnosed in 3 (8.8%) individuals, and type 2 diabetes — in 2 (5.8%). The average fasting blood glucose level in this group of patients was 5.4±0.1 mmol/l. The average level of insulin in the control group was 8.03±1.5 MIU / ml, the insulin resistance index (HOMO-IR) was within the normal range and amounted to 2.1±0.5 MIU/ml. Lipid metabolism disorders were detected in 7 (64.7%) men of the control group. A decrease in the level of physical activity was found in the majority of men in this group — 9 (64.7%), an increased level of anxiety — in 5 (14.7%), clinical and subclinical depression — in 3 (8.8%) examined individuals.

To assess the influence of risk factors on the development of myocardial infarction in the examined men and the possibility of predicting the risk of its development for a particular patient, a mathematical calculator was developed. For this purpose, using criteria for testing statistical hypotheses, the most significant predictors (risk factors) were identified, which later formed the basis of the riskometer.

The most significant predictors were those that showed differences between the MI group and the control group with a null hypothesis probability (p) of less than 0.15. For the men we examined, these predictors were: BMI value, OH level, LDL, HDL, insulin, HOMO-IR index, CRP, smoking. At the second stage, the predictive significance of the previously selected predictors was clarified using the method of multivariate binary logistic regression. If the calculated probability exceeded the a priori probability of MI, the patient was assigned to a high-risk MI group. At this stage, we excluded such parameters as BMI and OH, because we obtained data by applying the logistic regression method about the absence of significant differences in these indicators between patients with MI and the control group. At the third stage, we analyzed the adequacy of the classifying ability of the obtained regression model by the level of sensitivity and specificity, the value of the odds ratio using the Chi-square criterion. At the fourth stage, the calculation of the probability of MI development was implemented in the Excel 2007 software environment in the form of a riskometer. Enter the following values in this risk scale: predictors, resulting in the calculator automatically returns the calculated value of the risk of developing MI as a percentage for a particular patient and indicates the risk value in the categories “high” (above 76.7% for the examined men) or " low " (the calculated value is lower 76,7%).

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Conclusion: Thus, for middle — aged men with MI, the most significant risk factors were smoking, lipid metabolism disorders (mainly due to an increase in LDL levels), overweight and abdominal obesity; for older men, additional hypertension and inactivity, the presence of burdened heredity, disorders of carbohydrate metabolism with the development of insulin resistance, as well as abdominal type of obesity. A mathematical calculator developed using modern statistical methods allows you to help calculate the probability of developing a non-fatal heart condition. IM in a particular patient. The use of the calculator in therapeutic and cardiological practice will help identify groups at risk for MI among the male population and increase the effectiveness of primary and secondary prevention programs.

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