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EVALUATION OF THE IMPACT OF METABOLIC SYNDROME ON CARDIOVASCULAR COMPLICATIONS IN PATIENTS WITH ACUTE CORONARY SYNDROME

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Cardiovascular diseases (CVD) still remain the main cause of death in Uzbekistan [2]. Conducted clinical studies demonstrate the high prevalence of metabolic syndrome (MS) and its adverse effect on the course and prognosis of patients with acute coronary syndrome [3-9]. However, the results of studies on long-term prognosis in patients with MS who have had acute ST elevation myocardial infarction (STEMI) are somewhat contradictory, since different criteria have been used to diagnose MS. The studies mainly used the ATP-III or IDF criteria, but for the diagnosis of MS in studies conducted in Japan, the ATP-III criteria were modified taking into account national recommendations [4,7,10]. In the Uzbek population, for the diagnosis of MS, the criteria for GFCF [1] are used, with the use of which similar studies have not been carried out. In this regard, this study was planned, in which the diagnosis of MS was carried out according to the criteria for GFCF.

Materials and methods. The study consecutively included patients with STEMI admitted to the cardiac intensive care unit. Patients were divided into two groups depending on the presence or absence of MS diagnosed during hospitalization.

STEMI was diagnosed on the basis of generally accepted criteria - a typical increase and decrease in the dynamics of markers of myocardial damage (troponin, creatine phosphokinase (CPK), CPK MB) with the presence of at least one of the following signs:

- typical pain syndrome;
- new Q wave on electrocardiogram;
- elevation of the ST segment on an ECG of an ischemic nature;
- for the first time revealed complete blockade of the left leg of the bundle of His on the ECG.

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MC was determined according to the Recommendations of experts of the All-Russian Scientific Society of Cardiology (2009), where the presence of:

▪ abdominal obesity (AO): waist circumference (WC) of more than 80 cm in women and more than 94 cm in men (core feature), plus any two of the following criteria:

▪ arterial hypertension (AH) (BP ≥ 130/85 mm Hg);

▪ increase in the level of triglycerides (↑TG) (≥ 1.7 mmol/l);

▪ decrease in the level of HDL cholesterol (↓HDL) (<1.0 mmol/l in men; <1.2 mmol/l in women);

▪ increase in the level of LDL cholesterol (↑LDL) > 3.0 mmol/l, impaired carbohydrate metabolism (HMD): fasting hyperglycemia (fasting plasma glucose ≥ 6.1 mmol/l); impaired glucose tolerance (plasma glucose 2 hours after glucose load in the range of ≥7.8 and ≤11.1 mmol/l) are mandatory for diagnosis

Patients with chronic liver or kidney disease, acute infections, or surgery within the past 2 months were excluded from the study.

All patients, in addition to collecting complaints, anamnesis, physical examination, underwent an anthropometric study - calculation of body mass index (BMI) using the Quetelet formula, measurement of waist circumference (WC).

Laboratory research methods included the determination of blood glucose, lipid spectrum - total cholesterol (TC), high density lipoproteins (HDL), low density lipoproteins (LDL), triglycerides (TG) and peak levels of creatine phosphokinase (CPK) and creatine phosphokinase-MB (CPK-MB).

The instrumental study included ECG recording in 12 leads, echocardiography was performed by transthoracic access using an ultrasound scanner Toshiba SSH-YO(60)A (Japan) in duplex mode using two-dimensional mode and tissue harmonics, M-mode and Dopplerography. End diastolic size (EDS), end systolic size (ESD), thickness of the interventricular septum (IVS), posterior wall of the left ventricle (PLV), and left ventricular ejection fraction (EF) were assessed. Patients were followed up for 24 months (average 18±9.5 months) by analyzing medical records and telephone interviews. The follow-up period for each patient was calculated from the onset of AMI. Endpoints were death from any cause and major cardiovascular complications (CVS), which included cardiovascular death, recurrent myocardial infarction, and rehospitalization associated with worsening patients' condition.

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All patients received treatment in accordance with the standards of care. All patients gave informed consent to participate in the study. There was no conflict of interest associated with this manuscript.

Statistical data analysis was performed using the Statistica software package (Statsoft Inc. version 10.0). When comparing groups on a quantitative basis, parametric (Student's t-test) and non-parametric (Mann-Whitney test) methods were used. When comparing groups on a qualitative basis, Fisher's exact test was used. One-way regression analysis was used to identify factors influencing the risk of CVC development and mortality. Differences were considered statistically significant at $p < 0.05$.

Research results and discussion. The study included 112 patients, including 76 patients with MS. In the group of patients with MS, there was a trend towards the predominance of women (table 1). The groups were comparable in age and the number of patients with arterial hypertension, however, in the group of patients with MS, there were lower indicators of myocardial pumping function, expressed in lower EF values and a change in the index of impaired local myocardial contractility (INLM).

Table 1 Patient characteristics

Indicators	Patients with MS (n=76) (%)	Patients without MS (n=36) (%)	p
Age, years	64,9±9,4	62,5±11,1	0,23
Male	48%	78%	0,053
Waist circumference, cm	105,9±10,56	91,1±14,19	<0,0001
Arterial hypertension	98,7%	86,1%	0,66
Carbohydrate metabolism disorders	35%	25%	0,027
↑ LDL	74%	33%	0,037
↓HDL	77%	25%	0,004
↑ TG	81%	33%	0,016
FV,%	50,7±6,1	53,3±6,05	0,03
INLSM	0,92±0,55	0,64±0,37	0,002

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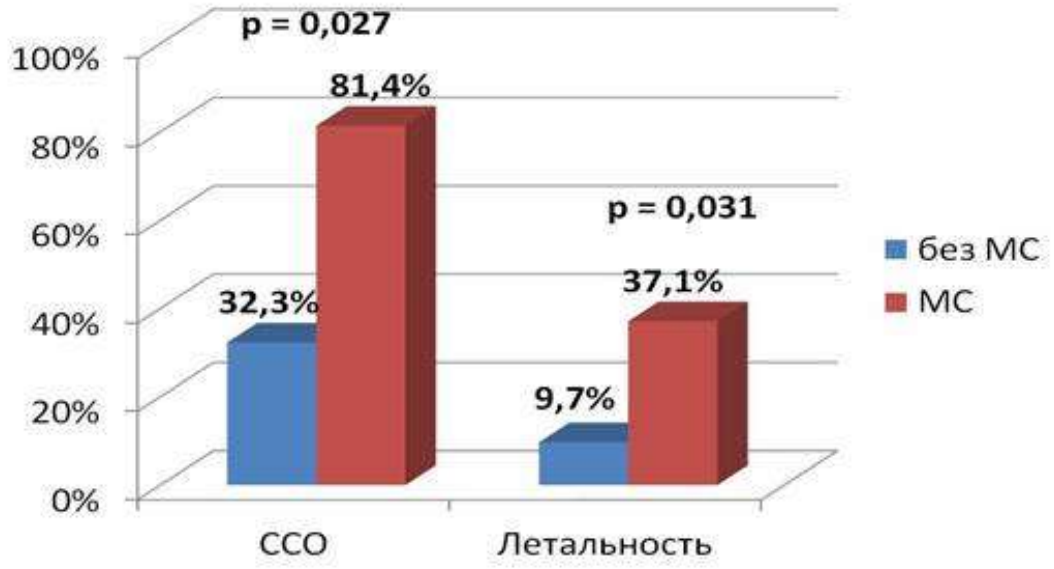

Mortality and cardiovascular complications

table 2

Analysis of the impact of MS on the risk of mortality and cardiovascular complications

Index	OR(Cl 95%)	p
Cardiovascular Complications	6,96 (2,87–16,89)	0,00001
Mortality	6,01 (1,66–21,77)	0,005

In our study, a 28.07±10.7-month follow-up revealed a higher mortality rate in patients with MS compared with the control group (37.1% of patients with MS versus 9.7% of patients without MS, p = 0.031) (drawing). An increase in the incidence of CVC was also found (81.4% of patients with MS versus 32.3% of patients without MS, p = 0.027). The incidence of recurrent MI and rehospitalization did not differ significantly between the groups. Using logistic regression, it was found that the presence of MS significantly increases the risk of mortality, which was OR 6.01 (Cl 95%: 1.66–21.77). Similar results were obtained when assessing the risk of CVD, which was OR 6.96 (Cl 95%: 2.87–16.89) in patients with MS (Table 2).

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The results of our work are comparable with the results of a number of studies, for example, with the MIRACLE study [8], in which the presence of MS was associated with an increase in the incidence of CV events and an increased risk of mortality in patients with MS and ACS. Similar results were also obtained in the works of C. Boulon et al. [3], as well as in the OACIS study [4], despite the fact that the observation period in these studies varied over a fairly wide range - from 30 days after ACS to 10 years. In the study by Zeller M. et al., as in our work, an increased risk of cardiovascular mortality was observed in 383 patients with MS after ACS. In their work, MS was an independent predictor of risk of all-cause mortality (OR, 1.62; 95% CI, 1.01–2.59) and risk of cardiovascular mortality (OR, 2.4; 95% CI, 1. 16–4.94) over a 10-year follow-up period. The OACIS study also showed that the presence of MS was an independent risk factor for the development of CVD during 725 days of observation (OR 1.148Cl 95%: 1.13–1.94) [4]. This study did not examine the role of each MS component separately, but it was shown that an increase in the number of MS components increases the risk of developing CVD. The results of the OACIS study partially agree with the data of Y. Uchida et al. [9], which also showed that the presence of MS was an independent risk factor for the development of CVD during 1200 days of observation (OR 4.85 Cl 95%: 1.28–18.3).

Thus, in most of the studies mentioned above, MS was a risk factor for mortality and CV events. In these studies, MS was diagnosed using IDF criteria, and in some of them, using modified IDF criteria. It should be noted that in many of these studies, one of the components of MS was obesity, which was diagnosed by an increase in BMI. In our study, in contrast to the above works, WC measurement was used to diagnose MS. Thus, despite certain differences in the diagnosis of MS, we were able to show the impact of MS, diagnosed according to the criteria for HFCS, on outcomes in patients after ACS.

Conclusions. Based on the results of our study, we can conclude that MS is a risk factor for the development of CVC and mortality in patients with MS who have had AMI with ST segment elevation.

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