PREVALENCE OF COMORBID PATHOLOGY IN PATIENTS WITH ACUTE MYOCARDIAL INFARCTION

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Summary: The high prevalence of diseases of the cardiovascular system and their pathophysiological association with various comorbid conditions contribute to the progressive growth of patients with a combination of several diseases and/or syndromes, including cardiac pathology as the main component.

Combined pathology creates a new clinical situation that requires consideration of its features when choosing a treatment, diagnostic and preventive tactics. The influence of comorbid pathology on clinical manifestations, diagnosis, prognosis and treatment of diseases of the circulatory system (CVD) is multifaceted and mutual.

The presence of comorbid diseases and high cardiovascular risk contributes to an increase in the duration of hospitalization, the onset of disability, prevents rehabilitation in the required volume, and increases the number of complications.

Keywords: comorbid pathology, myocardial infarction, prevalence.

Introduction. Modern treatment of CVD is based on the use of minimally invasive surgical interventions, such as coronary artery stenting. Currently, the proportion of stenting procedures is on average 70% of all therapeutic interventions on the vessels of the heart [4]. Improving the treatment of CVD has led to an increase in life expectancy, and this, in turn, has led to an increase in the incidence of comorbidity [3].

Thus, the average number of comorbid diseases in young patients is 2.8, and in elderly patients 6.4. At the age of 19 years, comorbid pathology is present in 10% of patients, and over 80 years old already in 80%. [7]. According to domestic studies based on pathoanatomical materials, 94.2% of patients have comorbid pathology [9].

Comorbidity is also of great social importance. Thus, in the United States of America, more than 80% of health care costs are spent on patients with four or more chronic diseases, and health care costs rise exponentially with an increase in the number of diseases. [2, 6]

The diverse comorbid background of the patient creates objective difficulties for practitioners, which requires a more multifaceted approach and consideration of all features when choosing drug therapy regimens and surgical tactics [1, 5].

In this regard, our study on the impact of comorbid pathology on the course and survival of patients with coronary artery disease who underwent myocardial infarction is certainly relevant.

Purpose of the study. The aim of the study is to assess the severity of the systemic inflammatory response and the severity of AMI in patients with comorbidities: type 2 diabetes, COPD, peptic ulcer (PU) of the stomach and duodenum, anemic syndrome (AS).

Material and research methods. . We examined 99 patients with acute myocardial infarction hospitalized in the intensive care unit (ICU) for the period from 2020-2021, including 113 patients with a fatal MI.

Results and Research. In almost all examined patients - 94% of AMI developed against the background of arterial hypertension, which does not allow us to exclude the influence of this factor on the clinical course of the disease or to evaluate it in a comparative aspect along with other concomitant diseases. In this regard, patients with AMI and AH were combined into the comparison group "A". The general clinical characteristics of patients with comorbid pathology and in the comparison group are shown in Table 2.

Table 1 Comparative clinical characteristic of AMI patients with and without comorbidities, M±SD, n (%)

Indicator	Comparison group "A" (AMI and AH)	Accompanying illnesses				
		type 2 diabetes	COPD	I WOULD	Anemia	2 or more
Examined	258 (51.7)	76 (15.2)	43 (8.6)	20 (4)	53 (10.6)	49 (9.8)
Age, years	66.8±11.0	68.8±8.9	71.0±9.8	65.8±9.4	73.1±10.0	68.2±10.0
Women	104 (40.3)	55 (72.4)	10 (23.3)	8 (40)	38 (71.7)	34 (69.4)
MI with Q	160 (62)	47 (61.8)	28 (65.1)	14 (70)	28 (52.8)	25 (51)
Repeated MI	81 (31.4)	27 (35.5)	14 (32.6)	8 (40)	15 (28.3)	23 (46.9)
thrombolysis	111(43)	35(46)	12(27.9)	12(60)	12 (22.6)	17(34.7)
FC according to NYHA III-IV	163 (63.2)	54 (71.1)	29 (67.4)	13 (65)	41 (77.4)	38 (77.6)
LV EF, %	55.7±10.8	52.3±12.2	54.5±10.9	57.2±10.6	55.3±11.1	52±11.6
Pulmonary edema	43 (16.7)	21 (27.6)	11 (25.6)	2 (10)	13 (24.5)	17 (34.7)
Shock	33 (12.8)	12 (15.8)	10 (23.3)	2 (10)	11 (20.8)	10 (20.4)
Aneurysm	37 (14.3)	16 (21.1)	4 (9.3)	4 (20)	5 (9.4)	5 (10.2)
fatal MI	51 (19.8)	17 (22.4)	14 (32.6)	2 (10)	17 (32.1)	12 (24.5)
Leukocytes	9.3±4.0	9.3±3.4	8.4±3.1	9.3±5.1	8.6±3	8.9±3.5
ISLC	3.2±2.0	3.1±2.2	2.8±1.5	3.6±2.9	2.9±1.6	3.2±1.9
ISNL	4±3.6	3.6±2.8	3.3±2.2	4.3±3.9	3.7±3	3.9±2.5
LII	2.6±2.1	2.4±1.7	1.8±1.5	2.8±2.4	2.3±2.2	2.4±2

In general, the comorbidity in the sample was 48.3%. The average age of AMI patients with and without comorbidity was 70.0±9.7 and 66.7±11.0 years, respectively (p<0.05). The proportion of patients with 2 or more forms of combined (multiple) pathology is about 10%. This group includes 49 patients, the majority of which are 34 people. (69%), along with such nosological forms as COPD, AS, PU, have a history of diabetes mellitus, which determines the clinical features of the course of AMI.

Data on the prevalence of comorbidities in AMI patients included in the study are consistent with those presented in the literature. In general, the proportion of patients with AMI in combination with DM2 was 22%. Among them, more than 73% of women are over 65 years old. According to the multinational registries GRACE, OASIS and EHS-ACS, from 19 to 23% of patients with AMI had previously diagnosed diabetes. Data on the prevalence of COPD in patients with AMI could not be found in the available literature. The combination of MI and COPD was detected in 13% of the examined, which is 1.3% more than the proportion of patients with COPD in the population of people over 40 years old. According to epidemiological data, the very presence of COPD increases the risk of MI by 1.4 times. About 75% of patients with COPD are men. The proportion of smokers is 33%, while in the comparison group there are 19%. In the group of patients with MI and concomitant peptic ulcer (6.2%), men also predominate - 55%, mean age 61.8±8.6. Anemia was found in 17.4% of the examined patients, which is consistent with the results of recent studies. Including 72% of women over

70 years old. Most (77%) cases of AS are represented by mild anemia with hemoglobin content above 90 and >110 g/l and 23% of moderate and severe degree (70-90 and >70 g/l).

As the analysis showed, in groups of patients with MI with comorbid pathology, the prevalence of recurrent infarcts is on average 15% higher, with multiple pathology, in which DM2 predominates - by 49%. The frequency of CHF III-IV functional classes according to NYHA tends to increase in the presence of concomitant diseases by an average of 15-22% compared with group "A". There were no significant differences between the groups in terms of the location of MI and the presence of the Q wave ($p > 0.05$). The results of an echocardiographic study did not reveal a statistically significant increase in the end diastolic and end systolic dimensions of the left ventricle (LV), indicating the development of LV dilatation in patients with comorbid pathology.

In patients with AMI in combination with DM2, as well as in the group with multiple pathologies, a statistically significant increase in the frequency of such an urgent complication as pulmonary edema was revealed ($p < 0.01$), which corresponds to the literature data. In general, the prevalence of pulmonary edema and cardiogenic shock is 1.5 times higher in patients with AMI in the presence of concomitant pathology. When combined with COPD, the frequency of the latter significantly increases ($p < 0.05$).

In groups with comorbid pathology, hospital mortality is 20% higher than in the comparison group. The average duration from the moment of hospitalization to the time of death is 3 (1.5; 7) days. In the presence of anemia, in-hospital mortality increases by more than 1.6 times compared with group A ($p = 0.019$). The obtained data are consistent with the results of the latest studies, which found that the presence of anemia on admission of a patient with ACS is an independent predictor of hospital mortality.

A study of the dependence of the risk of in-hospital mortality depending on the intensity of the systemic inflammatory response, assessed by the level of leukocyte indices of cellular reactivity, showed a significant increase in the risk of a fatal outcome of AMI with an increase in ISLC values. The values of leukocyte indices are calculated as the ratio of various forms of leukocytes and do not depend on their total number.

In recent years, data have been obtained indicating that a high initial level of leukocytes in the blood reliably reflects the likelihood of developing cardiogenic shock, pulmonary edema, and increased mortality in patients with myocardial infarction. In this regard, the results of assessing the severity of the course of AMI and the risk of a fatal outcome, obtained using leukocyte indices, were compared with the results of assessments by the level of leukocytes. Figures 1 and 2 show the results of approximation of group-average pairs of ISLC values, leukocyte levels, and the proportion of deaths at the hospital stage.

On fig. 1 it can be seen that the number of deaths at the hospital stage increases significantly with ISLC values>2.7, which determine a hyperreactive inflammatory response. In the hyporeactive type of SVR (ISLC values <1.8), an increase in the proportion of deceased patients was also noted, compared with the normative course of the inflammatory reaction (ISLC 1.9–2.7). The resulting distribution and the trend line in fig. 2 also indicate an increase in the risk of death depending on the level of leukocytes and are consistent with literature data. At the same time, when assessing the risk using the index of the ratio of granulocytes and agranulocytes - ISLC, a higher coefficient of determination $R2 = 0.68$ was obtained. In addition, in recent years it has been proven that in the early phase of acute myocardial infarction, only a subpopulation of neutrophils is massively activated [9]. Given these factors, the use of ISLS to predict the development of complications and mortality in AMI can be considered a priority.

Mean group values of leukocyte indices in AMI patients with and without comorbid pathology have no statistically significant differences (Table 2). The ratio of hypo -, normo - and hyperreactive types of SVR in groups with combined pathologies is shown in Fig. 3.

Rice. 3. Correlation of SVR types in groups of AMI patients with concomitant pathology

As can be seen in the figure, the hyperreactive type of SVR is predominant in the acute period of AMI, regardless of the presence or absence of comorbid pathology, the detection rate ranges from 43% to 49% of cases. There were no statistically significant differences according to the chi-square test depending on the type of SVR between groups with various forms of comorbidity: with concomitant DM2 p=0.769, COPD p=0.608, PU p=0.749, anemia p=0.799.

Conclusion. According to the results of the study, the comorbidity of patients with AMI was 48.3%. The most common comorbidity is type 2 diabetes mellitus - 22%. The presence of comorbid pathology increases the risk of complications and adverse outcomes of MI. The frequency of such urgent complications as pulmonary edema and cardiogenic shock increases by 1.5 times. In the combination of AMI and DM2, as well as in the group with multiple pathologies, a statistically significant increase in the incidence of pulmonary edema was revealed ($p < 0.01$).

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