

Chronic Heart Disease and Comorbidity

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Summary: Accompanying pathology aggravates course and prognosis of diseases. We examined influence of comorbidity on unstable angina pectoris clinical course. The course of angina pectoris has been estimated by Sietle Questionnaire of Stenocardia, comorbidity was estimated on Charlson comorbidity index. There have been conducted electrocardiography, echocardiography, Holter monitoring, biochemical blood tests, glomerular filtration rate (MDRD), anthropometric data. 64 hospital patients with unstable angina pectoris were examined. There were detected a lot of associated diseases (from 2 to 6 in one patient), all the patients had chronic kidney disease. It has been revealed that increase in comorbidity is associated with increase of frequency of stenocardia, physical load limitation and quality of life impairment.

Keywords: unstable angina pectoris, comorbidity, prognosis.

Most patients seeking medical care have more than one disease of the internal organs. This is due to the high prevalence and common pathogenetic mechanisms of many diseases, in addition, the number of comorbid diseases increases with age [7; 3].

Cardiovascular diseases, in particular coronary heart disease (CHD), remain leaders in the list of the main causes of death. Therefore, the study of factors, including comorbidity, that can affect the course of CHD, continues to be an important scientific task. For example, it has been shown that in patients with CHD, chronic kidney disease occurs in 52%, arterial hypertension - in 67%, obesity - in 45%, diabetes - in 38%, and COPD - in 62% of cases [5, 2, 4, 1].

Many studies confirm that the presence of concomitant pathology worsens the course and outcomes of diseases. In particular, comorbidity increases mortality in patients with stable angina [6]. At the same time, the influence of comorbidity on the clinical picture of unstable angina has not yet been sufficiently studied.

The aim of this study was to examine the relationship between comorbidity and the clinical picture of unstable angina. In accordance with the stated goal, the following tasks were formulated: to assess the clinical manifestations of unstable angina; to determine the presence of comorbid diseases and conditions; to examine the relationship between comorbidity and the clinical picture of unstable angina.

Materials and methods

The study included patients over 40 years of age admitted to the cardiology department of the City Cardiology Hospital with a diagnosis of unstable angina. The latter was established in accordance with the generally accepted criteria in cardiology (VNOK, 2007). 64 patients were examined, including 41 men and 23 women, whose average age was 60.7 years (CI 57.9-63.5).

The examination methods included electrocardiography (ECG) in 12 leads, echocardiography, Holter monitoring, biochemical blood analysis (glucose, cholesterol, creatinine, troponin T, MB fraction of creatine phosphokinase), estimated glomerular filtration rate according to MDRD. Anthropometric data (height, weight, body mass index, waist circumference) were taken into account. Comorbidity was assessed by the Charlson index in points. Points are awarded for age over 50, history of myocardial infarction, stroke, congestive heart failure, vascular atherosclerosis, lung, liver, stomach, kidney diseases, cancer - depending on the severity of the pathology.

To assess the severity of angina, the Seattle Angina Questionnaire (SAQ) was used, which includes 11 questions and consists of scales of physical limitations (question 1), recent changes in the severity of angina pain (question 2), frequency of angina (questions 3-4), satisfaction with treatment (questions 5-8) and quality of life due to angina (questions 9-11)

Comorbid diseases and syndromes in patients with unstable angina Table 1.

Diseases and syndromes	%
Arterial hypertension	82
Chronic kidney disease stage 1-2	70
Chronic heart failure I-II FC	67
Obesity I-III degree	44
Dyslipidemia type 2	31
Chronic kidney disease stage 3-4	30
Chronic heart failure III-IV FC	26
Overweight	25
Type 2 diabetes	9,5
History of acute cerebrovascular accident	8
Ejection fraction < 40%	5

Results and discussion

The prevalence of comorbid diseases and conditions in patients with unstable angina is presented in Table 1.

When comparing groups of patients with chronic heart failure of I-II and III-IV functional classes, no significant differences were found in the SAQ scales, although it was noted that physical limitation, pain lability, angina frequency and satisfaction with treatment were higher, and the quality of life was lower in patients with more severe CHF. Dividing patients into groups by myocardial systolic function impairment (left ventricular ejection fraction less than 40% and more than 40%), no significant differences in the indicators on the SAQ scales were also found.

In patients with arterial hypertension, physical limitation (31 versus 47, $p = 0.005$) and angina frequency (43 versus 70, $p = 0.0005$) were significantly higher compared to patients without high blood pressure.

No significant differences in angina characteristics were found in groups of patients with mild

(stage 1-2) and moderate (stage 3-4) chronic kidney disease. At the same time, a correlation was found between the glomerular filtration rate and the degree of physical limitation ($R=0.48$; $p=0.0002$), as well as the quality of life of patients due to angina ($R=0.45$; $p=0.005$). The frequency of angina, pain lability, satisfaction with treatment according to the SAQ scale, as well as ECG, echocardiography and Holter monitoring indicators are not significantly associated with the glomerular filtration rate.

Blood glucose levels do not correlate with SAQ, ECG and echocardiography parameters, however, a direct and significant relationship between glycemia and the total duration of ischemia during the day was revealed according to the results of Holter monitoring ($R=0.76$; $p=0.016$). Patients with diabetes mellitus have significantly lower quality of life due to angina (48 versus 59, $p=0.046$). No significant association of body mass index with unstable angina characteristics was found. Charlson comorbidity index was moderately associated with unstable angina characteristics: physical limitation ($R=-0.53$; $p=0.0003$), angina frequency ($R=-0.43$; $p=0.005$) and angina-related quality of life ($R=-0.46$; $p=0.002$), while pain lability, treatment satisfaction and comorbidity were not significantly associated. Similar results were obtained when dividing patients into groups with Charlson index 0-4 points and 5-9 points. In the group with a higher comorbidity index, there was higher physical limitation (23 vs. 41, $p=0.02$), frequency of angina (35 vs. 57, $p=0.007$) and lower quality of life (19 vs. 33, $p=0.002$).

When conducting a regression analysis to assess the relative contribution of the studied set of factors to the degree of expression of the linear relationship with the frequency of angina pain, it was found that the frequency of angina (FP) is affected by the glomerular filtration rate (GFR), creatine phosphokinase (CPK) level, Charlson comorbidity index, end-systolic dimension (ESD) and ejection fraction (EF) of the left ventricle: $FP = 363.5 - 0.57 * GFR + 0.56 * CPK - 0.80 * \text{comorbidity} - 0.73 * ESD - 0.98 * EF$

Thus, the study of the relationships between comorbidity factors and the clinical picture of unstable angina allows us to draw the following conclusions: 1) all patients with unstable angina were found to have several (from 2 to 6) comorbid diseases, 2) no relationships were found between the contractile function of the left ventricle and the clinical picture of unstable angina left ventricular function and the severity of CHF with the Seattle Angina Test indices, 3) patients with comorbid arterial hypertension have a higher frequency of angina and lower physical activity, 4) all patients with unstable angina had chronic kidney disease. A decrease in SCF is associated with a decrease in physical activity and quality of life in patients, 5) the level of glycemia is closely related to the duration of ischemia per day, and with concomitant type 2 diabetes, the quality of life decreases, 6) an increase in the comorbidity index is associated with an increase in angina, limitation of physical activity and a decrease in the quality of life of patients, 7) based on regression analysis, taking into account comorbidity factors, a regression model for predicting the frequency of angina was constructed.

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