Investigation the risk factors of coronary atherosclerosis
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Introduction. Atherosclerosis of the coronary arteries is the most frequent cause of myocardial ischemia. If the ischemic heart disease (IHD) appears, atherosclerosis of the coronary vessels presents with cardiac angina, heart attack, various sequelae and cardiac arrhythmias.

There are a number of factors of different nature, which contribute to development and progression of IHD: hypertension, overweight, smoking, hypodynamia, diabetes, etc. The results of one of the largest international research MONICA (Multinational Monitoring of Trends and Determinants in Cardiovascular Disease), the classic risk factors for atherosclerosis cannot fully explain the development of cardiovascular complications. This article is an attempt to find other factors in the development and progression of coronary artery (CA) atherosclerosis [1]. The aim of the article is to verify the existence of specific risk factors of coronary atherosclerosis in patients with tortuous CA.

Materials and methods. 121 patients with primary coronary arterioventriculography (CVG) carried out at the Amosov National Institute of Cardiovascular Surgery NAMS of Ukraine participated in the study described in the paper. Depending on the availability of tortuosity [2] and atherosclerotic lesion, patients were divided into 2 arrays of data. The first array included the data of patients with intact tortuous CA (n = 55, where n is the total number of patients in the group), CVG performed to diagnose coronary heart disease. The second array included patients with tortuosity and atherosclerotic lesions of the coronary vessels (n = 66) later subject coronary artery bypass grafting (CABG).

To identify factors affecting the development of sclerotic lesions of the CA, the following samples were compared: tortuous CA with sclerosis and tortuous CA with non-sclerosis. The statistical data processing employed the IBM Statistics 20.0 software package. To test hypotheses in comparing qualitative (categorical) data between independent groups, Pearson’s $\chi^2$ test was used. The 95% confidence interval was adopted, the difference between groups was considered reliable if $p < 0.05$, where $p$ is the probability of error of type I. A number of factors that had the most important influence on the progression of coronary sclerosis were selected from the indices under study. Parametric Spearman correlation analysis was used to study the statistical correlation of the indices. The models were constructed based on the binary logistic regression (BLR) method. In this model the influence of each
parameter was determined by assessing its weight or the corresponding coefficient, which were used to estimate the informative value and the predictive value of each factor in the progression of coronary sclerosis in patients with CA tortuosity. To perform the correlation analysis factors with the greatest influence on coronary sclerosis were selected from the indices under study.

**Discussion** According to the results of the correlation analysis seven categorical variables and one quantitative variables were selected, for which \( p < 0.05 \). To construct the model based on BLR method, 8 risk factors were included in the group were patients with non-sclerosis and sclerosis tortuous arteries were compared (Table 1).

<table>
<thead>
<tr>
<th>Table 1.</th>
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<tr>
<td><strong>Risk factors</strong></td>
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<tr>
<td>Sex</td>
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<tr>
<td>Hypertension</td>
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<tr>
<td>Triglycerids</td>
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<td>Cholesterol</td>
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<td>Inflammatory heart diseases</td>
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<td>Thyroid body diseases</td>
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<td>Type 2 diabetes</td>
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<td>Age</td>
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\[ a_0* = -8.4 \]

\( a_0 * \) – free term of logistic regression equation

The mathematical model of predicting the coronary sclerosis in the group of patients where patients with sclerosis and non-sclerosis tortuous coronary arteries were compared has the following form:

\[
z_1 = x_1 \cdot 1.7 - x_2 \cdot 0.002 - x_3 \cdot 0.11 + x_4 \cdot 0.17 + x_5 \cdot 2.4 - ... \]  
\[ ...x_6 \cdot 3.1 + x_7 \cdot 1.81 + x_8 \cdot 0.08 - 8.4 \]  

(1)

Analysis of the correlation coefficient (column 3, Table 1) in the group of patients where patients with sclerosis and non-sclerosis tortuous coronary arteries were compared showed that the most significant factors are gender and age.

**Conclusions.** Eight independent variables were used as a result of the construction of the model using BLR analysis. All these factors are
prognostically important and cannot be removed from the model without a serious decline in their quality.

BLR method revealed the risk factors of coronary atherosclerosis in patients with tortuous CA. These factors coincide with generally accepted ideas in world literature. A comparison of factors associated with atherosclerosis can more clearly identify the factors for both pathologies.

References

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Binary logistic regression analysis verified the existence of specific risk factors for coronary atherosclerosis in patients with tortuous coronary arteries. It was found that these factors coincide with generally accepted ideas in world literature.