PREDICTION THE PROBABILITY OF RETROMBOSIS IN PATIENTS WITH ACUTE CORONARY SYNDROME AND ST-SEGMENT ELEVATION DURING MEDICAL REPERFUSION THERAPY AND PERCUTANEOUS INTERVENTION

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Myocardial infarction with ST-segment elevation is about a third of all acute coronary events. Hospital mortality from myocardial infarction with ST-segment elevation according to national registries of the European Society of Cardiology is from 6 to 14%. Reduction in short-term and long-term mortality from myocardial infarction with ST-segment elevation is directly related to a wide reperfusion therapy or primary percutaneous intervention. Percutaneous intervention is preferable regardless of the time from the beginning infarction in patients with shock and those who thrombolysis is contraindicated. If percutaneous intervention cannot be performed in the recommended time frame, pharmacological reperfusion is performed (in the absence of contraindications). As close as possible to the patient is thrombolytic therapy. Effect of thrombolytic therapy is associated with the restoration of patency of the affected artery, limiting areas of necrosis, the viability and electrical stability of the myocardium, left ventricular function and decrease complications of acute coronary syndrome with the rise interval ST.

Existing evaluation scale cardiovascular risk in patients with acute coronary syndrome segment elevation ST, as a rule, take into account clinical and some laboratory parameters and don't allow to fully characterize the risk of complications of the disease. Since the methods of reperfusion therapy are being actively implemented in clinical practice, of particular interest is the study of the causes of adverse coronary events in patients with acute coronary syndrome and ST-segment elevation after reperfusion of the infarct-related artery with the use of thrombolytic therapy and percutaneous interventions, as well as their prediction in step reperfusion.

The aim is to determine the predictors of recurrent coronary events in patients with acute coronary syndrome with ST-segment elevation after reperfusion therapy in the form of systemic thrombolysis and percutaneous coronary intervention, as well as the development of computer programs predict the likelihood retrombosis in patients with acute coronary syndrome with ST segment elevation on the step of performing medical reperfusion therapy or percutaneous coronary intervention. The objects of study became the patients with acute coronary syndrome segment elevation ST.

The distribution of patients in the group carried out depending upon the type of reperfusion therapy. Group 1 consisted of patients who underwent thrombolytic therapy; group 2 - those who underwent primary percutaneous intervention. Surveyed patients of each group divided into two subgroups: with and without coronary artery retrombosis. The database is formed on the basis of clinical signs, results of laboratory tests and echocardiography. To determine the probability of recurrent coronary events was used logistic regression (logit model). In this approach, the probability is defined as follows:

$$p = \frac{\exp\left(b_0 + b_1 X_1 + ... + b_n X_n\right)}{1 + \exp\left(b_0 + b_1 X_1 + ... + b_n X_n\right)},$$

where the variables (predictors) X_i correspond to grounds of discrimination of the concerned groups . The model parameters b_i are estimated using maximum likelihood method. The most significant predictors are found on basis of the method of successive elimination of variables. As a criterion for the comparison of models was used the Akaike information criterion (AIC).

Group of patients with acute coronary syndrome segment elevation ST, which was carried out effective thrombolytic therapy consisted of 115 people aged 35 to 78 years. Patients in this group were divided into two groups: with rethrombosis of coronary arteries (40) and without rethrombosis (sub-group comparison, 75). After exclusion the less significant features, the ratio for the probability retrombosis in patients with acute coronary syndrome and ST-segment elevation after reperfusion therapy takes the form

$$p = \frac{\exp\left(1.303 - 0.065X_1 + 0.394X_2 + 0.248X_3 + 0.171X_4 + 0.155X_5\right)}{1 + \exp\left(1.303 - 0.065X_1 + 0.394X_2 + 0.248X_3 + 0.171X_4 + 0.155X_5\right)},$$

where X_1 is the systolic blood pressure (mm. Hg. art.); X_2 is the maximum segment elevation ST (mm); X_3 is the level of leukocyte Gl^{-1}; X_4 is the total contractility affected segments; X_5 is the concentration of troponin (ng / ml).

A group of patients with acute coronary syndrome and segment elevation ST after percutaneous coronary intervention was consisted of 112 people aged 35 to 78 years. Patients in this group were divided into two groups: with rethrombosis of coronary arteries (32) and without rethrombosis (sub-group comparison, 80). In this case, the probability of retrombosis is defined as follows

$$\begin{aligned} p = \exp\big(&-10.071 + 4.24001X_1 + 3.46229X_2 + 6.04796X_3 - 0.04664X_4 + \\ &+0.07953X_5 + 0.50134X_6 + 0.1608X_7 + 0.20728X_8\big)\times \\ \times\big(1 + \exp\big(&-10.071 + 4.24001X_1 + 3.46229X_2 + 6.04796X_3 - 0.04664X_4 + \\ &+0.07953X_5 + 0.50134X_6 + 0.1608X_7 + 0.20728X_8\big)\big)^{-1}, \end{aligned}$$

where X_1 is the localization of the defeat of the infarct-related artery (matching the affected area of the infarct-related artery the first segment of the left anterior descending branch of the left coronary artery); X_2 – «Killip» (class of acute heart failure patients on admission Killip1, Killip2 or Killip3 / Killip4); X_3 is the systolic blood pressure (mm. Hg. art.); X_4 is the heart rate X_5 is the maximum segment elevation ST (mm); X_6 is the troponin (ng / ml); X_7 is the overall contractility of affected segments.

On the basis of the logit-models are developed computer programs to predict the likelihood of retrombosis in patients with acute coronary syndrome and ST-segment elevation on the step of the medical reperfusion therapy or percutaneous coronary intervention. Computer programs are in place in the institutions of the Ministry of Health of the Republic of Belarus, specializing in treatment of the internal diseases (9th Clinical Hospital, National Clinical Medical Center and other).