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ACUTE CORONARY SYNDROME SUCCESSORS

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Abstract: Acute coronary syndrome (ACS) is a term used to describe a range of conditions (acute ischemia and/or infarction) associated with an abrupt reduction in coronary blood flow. Acute coronary syndrome is the commonest cause of morbidity and mortality in patients with coronary heart disease (CAD), contributing to an estimated 7.4 million deaths annually. It can be caused by a very tight stenosis and plaque rupture which is the most frequent cause of coronary thrombosis. Platelets usually aggregate on the site, thus limiting blood flow that increases rate of death in ACS patients. Acute coronary syndrome encompasses ST-elevated myocardial infarction, non ST-elevated, myocardial infarction and unstable angina[6]. ST-elevated myocardial infarction (STEMI) is a clinical syndrome defined by characteristic symptoms of myocardial ischemia in association with persistent ST elevation and subsequent release of biomarkers of myocardial necrosis. It is caused by complete occlusion of the culprit artery and mostly diagnosed in the presence of ischemic chest pain. Troponin (T or I), the biomarker of choice to diagnose myocardial necrosis, is often normal during the first few hours of STEMI, thus emergent percutaneous coronary intervention (PCI) can be helpful. Whereas, unstable angina (UA) and non ST-elevation (NSTEMI) are caused by incomplete occlusion of the culprit artery in 60–90% of cases.

Different factors were reported to have a strong correlation with the incidence of ACS and treatment outcomes. Some of the strongest predictors of ACS outcomes include a history of diabetes mellitus, hypertension, hyperlipidemia, family history of ACS, and smoking.[5,13–17] Similarly, the findings of an Ethiopian study also revealed that history of hypertension, being Killip class III and IV, and STEMI diagnosis were independent predictors of death.[12] The recovery rate of ACS patients was also determined by coronary revascularization, percutaneous coronary intervention, major bleeding, defibrillation, hospital stay, and age at admission.[18–20]

ACS encompasses a variety of disorders, including patients with recent changes in clinical symptoms or indications, alterations on the electrocardiogram (ECG), and a sudden increase in cardiac troponin (cTn) concentrations. ACS is linked to a variety of clinical presentations, including asymptomatic patients, patients with chronic chest pain or discomfort, cardiac arrest, electrical or hemodynamic instability, and cardiogenic shock [2].Furthermore, the majority of deaths occur during the early stages of ACS, specifically within the first 24 hours of the patient's hospitalization [3]. As a result, when ST-elevation or non-ST-elevation ACS (ST-elevation) occurs, the physician requires a "tool" to estimate the probability of death in order to make timely decisions and optimize patient management. To now, such a "tool" for assessing the likelihood of an undesirable outcome in patients consists of multivariate scales, the strength and significance of which are confirmed by ROC analysis [4]. Currently, there are numerous scales and methodologies for estimating the risk of death (GRACE, TIMI, PURSUIT, EuroSCORE II, RECORD), but they mostly consider well-known "classical" risk variables [6].However, when analyzing the research data, it should be noted that the search for universal predictors for assessing the risk of in-hospital mortality continues, combining a number of criteria: ease of use, taking into account the impact of comorbidity, as well as the results of laboratory and instrumental research methods [5]. That is why the establishment of a set of prognostic factors can help optimize risk stratification and accurately assess the probability of death at the hospital stage.

Key words: ACS, predictors, lethality, comorbidity.

Materials and methods. A sequential retrospective analysis was carried out that included 212 patients with ACS (n=101 – the main group of patients who died in hospital, n=124 – the control group) hospitalized in the Department of Emergency Cardiology of the Regional Vascular Department for the period from September 2022 to July 2024. The criteria for inclusion of patients in the study were men and women aged 18 years and older with an established diagnosis of ST ACS or ST ACS. Exclusion criteria: acute myocardial infarction, which has become a complication of PCI or coronary artery bypass grafting. An analysis of the clinical and demographic characteristics of patients with ACS was carried out: gender, age, timing of admission to the PCI center, blood pressure (BP), heart rate (HR), etc.; general clinical and biochemical blood analysis; the results of electrocardiography with ST-segment evaluation, inversion of the T wave and the appearance of a pathological Q wave in two or more adjacent leads; data obtained by transthoracic echocardiography and coronary angiography. Statistical processing of the data was performed using Statistica version 10.0 and MedCalc version 20.0. For each sample, the hypothesis about the normality of the distribution of indicators was tested using the Shapiro-Wilk test.

Results. As a result of data processing and comparative analysis, the following statistically significant differences were obtained between the main group of patients who died in the hospital and the control group: patients from the study group were older – the mean age was 73±10.2 years versus (vs 63.2±9.2 years in the control group (they refused coronary angiography (CAG) followed by possible stenting of the infarction-associated artery, which turned out to be an independent fatal predictor for patients with ACS (OR 159.34 (95% CI 21.41–1185.49); p<0.0001). It was also found that CAG was not performed in 20 patients from the study group (20 (20%) patients out of 101) for other reasons, two of whom underwent TLT. Thus, the overall percentage of correctly classified cases is 88.00%, which indicates the high statistical significance of the multivariate prognostic model. This model, evaluated using ROC analysis (Fig. 1), has a high predictive potential: AUC – 0.957 (95% CI 0.921–0.979; p0.3756 increases the risk of in-hospital mortality, and the value of ≤ 0.3756 is associated with a low risk of in-hospital mortality in patients with ACS.

Discussion. Diagnosing ACS is not an easy task. Even the typical symptoms of ACS have low sensitivity and specificity. For example, among patients admitted to the hospital with chest pain characteristic of ACS, only 50% later confirmed the diagnosis of AMI or unstable angina; at the same time, 30–50% of patients with AMI do not have typical chest pain. Despite this, it is possible to assume the fact of the development of ACS in a patient only on the basis of an analysis of complaints (there are no other ways yet), but for this it is necessary to obtain the most complete anamnestic information. Analysis of the sensitivity and specificity of individual symptoms of ACS has shown that it is impossible to diagnose only one symptom. Localization and nature of pain. Typical symptoms of ACS include squeezing, tightening, pressing or burning pain behind the sternum in the depth of the chest. The pain does not have clear boundaries and is protracted - it lasts 10-20 minutes or more. Often, chest pain in ACS has a characteristic radiation to the left arm, left shoulder, throat, lower jaw, epigastric region, as well as to the back, the pain can migrate. In some cases, ACS pain is localized only in the areas of irradiation, and there is no pain in the chest.

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