**DETERMINATION OF LEFT VENTRICULAR SYSTOLIC DYSFUNCTION PROGRESSION IN PATIENTS WITH ACUTE MYOCARDIAL INFARCTION AND TYPE 2 DIABETES MELLITUS TAKING INTO ACCOUNT OF TENASCIN C**

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**Abstract**

At present the role of tenascin C in patients with acute myocardial infarction and type 2 diabetes mellitus has remained unclear.

**The aim of the study** – construction of a model prediction of left ventricular systolic dysfunction in patients with acute myocardial infarction and type 2 diabetes, taking into account the level of tenascin C.

**Methods.** The content of tenascin C was determined by the immunoassay method using a set of “Human Tenascin-C Large (FNIII-C)” reagents (Immuno-Biological Laboratories Co. Ltd. (IBL), Takasaki-Shi, Japan ).

**The results.** The study showed that over time the content of tenascin C at the 10-14th day decreased in patients with acute myocardial infarction and type 2 diabetes mellitus compared with patients with AMI without type 2 DM. It has been established practical to elaborate a model taking into account tenascin C to predict of development of left ventricular systolic dysfunction in patients with acute myocardial infarction and type 2 diabe-tes mellitus. Consideration of tenascin C, creatinine, BMI and diastolic blood pressure indices in one model makes it possible to increase the specificity to 77% in high sensitivity of 89%.

**Conclusion.** This suggests that diabetes may be associated with exhaustion of tenascinemia. Tenascin C are found the prediction properties of development of left ventricular systolic dysfunction in patients with acute myo-cardial infarction and concomitant type 2 diabetes mellitus.

**Keywords:** acute myocardial infarction, tenascin С, diabetes mellitus type 2, left ventricular systolic dys-function.

Ischemic heart disease (IHD) is ranked first among cardiovascular diseases and is the leading cause of mor-tality worldwide and in Ukraine [3; 7]. The course and prognosis of IHD depends on the presence of comorbid pathology. Type 2 diabetes mellitus (type 2 DM) is a significant factor that predisposes an unfavorable course of coronary artery disease [2].

Currently, 347 million people are suffering from diabetes, 90% have type 2 DM [6]. The prevalence of diabetes mellitus in Ukraine is 1264500 individuals. Thus, type 2 diabetes is a global problem not only in Ukraine but also in the world [3; 6]. 48 Norwegian Journal of development of the International Science No 20/2018

Tenascin C is known to be a non-matrix protein that plays an important role in the development of car-diovascular diseases, namely: regulating the behavior of cells and matrix organization in tissue remodeling; differentiation of cardiomyocytes; angiogenesis. Tenascin C is found in blood in pathological conditions such as myocarditis, myocardial infarction, atheroscle-rosis, heart aneurysm. Therefore, it can be a promising biomarker for diagnosis of cardiovascular disease. Tenascin C reduces cellular adhesion, regulates the ex-pression and activity of matrix metalloproteinases, and enhances fibrosis [4].

Scientists Yao H.C., Han QF [10] investigated the prognostic value of tenascin C in patients with chronic heart failure and coronary heart disease. They demon-strated a correlation between the level of tenascin C and left ventricular ejection fraction in patients with coro-nary heart disease and chronic heart failure (CHF).

The study [9] analysed cases of re-hospitalization due to deterioration of heart failure and mortality throughout the year. The obtained results indicated that the level of tenascin C in patients with heart failure was higher compared to the control group. It is important to note that the level of tenascin C in patients with class IV CHF according to the New York Heart Association (NYHA) classification was higher compared to patients with NYHA Class II CHF. The level of tenascin C neg-atively correlated with the left ventricular ejection frac-tion. It has been shown that elevated levels of tenascin C are the first signs for the endpoint of re-hospitaliza-tion and mortality.

It has been proved today that the content of tenas-cin C increases in patients with acute myocardial in-farction [8, 9]. However, the issue of changes in tenas-cin C levels in type 2 diabetes in patients with acute myocardial infarction (AMI) remains disputable.

**The aim of the study** is to evaluate the progres-sion of left ventricular systolic dysfunction in patients with acute myocardial infarction and type 2 diabetes, taking into account tenascin C levels.

**Materials and methods of the study**

The study involved examination of 120 patients, including 46 women (42.6%) and 74 men (57.4%) who underwent inpatient treatment in myocardial infarction unit of Kharkiv City Clinical Hospital No. 27 (clinical center of the Department of Internal Medicine No. 2, Clinical Immunology and Allergology of Kharkiv Na-tional Medical University of the Ministry of Health of Ukraine) and in the first cardiology department of the Central Clinical Hospital “Ukrzaliznytsia”. All the pa-tients were divided into the following groups: the main group included 60 patients with AMI accompanied by type 2 DM (among them 31 men, 29 women aged 45-88); comparison group comprised 40 patients with AMI without type 2 DM (among them 32 men, 8 women aged 45-75). Control group involved 20 practically healthy individuals (including 11 men and 9 women aged 22-27).

The content of tenascin C was determined by im-munoassay method using a set of human Tenascin-C Large (FNIII-C) (Immuno-Biological Laboratories Co. Ltd. (IBL), Takasaki-Shi, Japan), troponin I by immu-noenzyme method using “Troponin I” (HEMA, Mos-cow, Russia). The immunoassay studies were con-ducted in the Central Research Biochemical Laboratory at Kharkiv National Medical University.

Statistical computer processing of results was car-ried out using Microsoft Office Excel and Statistica 6.0 software. Comparative analysis of samples was carried out by calculation of arithmetic mean and statistical er-ror of the mean arithmetic (M ± m). Differences be-tween the groups in the distribution close to normal were estimated using Student t-test. The differences were considered statistically significant at (p <0.05). Pearson criterion was used in analysis of the difference in frequencies in two independent samples.

**Results and their discussion**

The study showed that tenascin C level on the 1-2nd day (Table 1) was significantly higher by 34% (p˂0.05) in patients with AMI without type 2 DM as compared to the control group. In patients with AMI and type 2 DM the content of tenascin C was higher than in the control group by 14.9% (p = 0.07). The level of tenascin C on the 10-14th day in patients with AMI and type 2 DM was 38% lower as compared to patients with AMI without type 2 DM (p˂0.05). The content of tenascin C on the 10-14th day in patients with AMI without type 2 DM was 71% higher than in the control group (p˂0.05). Taking into account possible influence of tenascin C on the system of extracellular matrix [4], the results of the study indicate that type 2 DM is asso-ciated with the depletion of tenascin C in patients with AMI.

Table 1

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| --- | --- | --- | --- |
| **The content of tenascin C and troponin I in patients with acute myocardial infarction with or without type 2 diabetes mellitus** Index, unit of measurement | AMI with type 2 DM (n = 60 patients) | AMI without type 2 DM  (n = 40 patients) | Control group  (n = 20 patients) |
| М ± m | | | |
| Tn С on the 1-2nd day, ng/ml | 18.64±1.28 | 20.12±1.48\* | 14.93±0.97 |
| Tn С on the 10-14th day, ng/ml | 15.90±1.34# | 25.67±1.92\* | 14.93±0.97 |
| Troponin I, ng/ml | 2.75±0.79 | 3.95±0.66 | 0.19±0.68 |