PREDICTION OF THE DEVELOPMENT OF DIASTOLIC DYSFUNCTION OF THE LEFT VENTRICLE IN PATIENTS WITH DIABETES

Tursunova M.A.
Assistant at the Department of Propaedeutics of Internal Diseases
Andijan State Medical Institute.

Abstract

More than half of patients with chronic heart failure (CHF) do not have a decrease in left ventricular ejection fraction (LVEF). The main causes of heart failure with preserved ejection fraction (HFpEF) are hypertension and type 1 diabetes mellitus. About half of patients also suffer from chronic kidney disease. The average age of patients with HFpEF is 73±8 years. NYHA functional class is predominantly II–III, LVEF 57±8%. This condition is more common in women. Natriuretic peptides, which are destroyed by neprilysin, play an important role in the pathogenesis of heart failure. Symptoms and signs of HFpEF are nonspecific. To confirm the presence of CHF in such patients, it is necessary to determine the level of natriuretic peptides in the blood and identify signs of LV diastolic dysfunction.

Keywords: left ventricular diastolic function, diabetic cardiomyopathy, Symptoms1 diabetes mellitus

Introduction

Chronic hyperglycemia triggers a whole cascade of pathological changes that entail endothelial dysfunction, an imbalance in oxidation-reduction processes

that contribute not only to the development of macro- and microvascular complications, but also to autonomic neuropathy of blood vessels and the heart, which contributes to a worsening prognosis for cardiovascular diseases in diabetes mellitus [3, 4]. Left ventricular diastolic dysfunction (LV DD), which develops without a clear connection with atherosclerotic lesions of the coronary arteries and arterial hypertension in patients with diabetes mellitus, is currently considered as diabetic cardiomyopathy [4–7]. Certain aspects of the development of diabetic cardiomyopathy at the molecular-cellular level remain insufficiently studied and controversial, especially in patients with type 1 diabetes [4, 8]. Myocardial damage in diabetes is caused not only by metabolic disorders, microvascular complications associated primarily with the development of endothelial dysfunction, but also fibrosis processes [4,], the relationship between myocardial fibrosis markers and the severity of myocardial remodeling processes in patients with type 2 diabetes mellitus [4, 5] has been shown. Increased production of MMP affects the development of myocardial fibrosis with subsequent impairment of diastolic filling of the LV [4]. Studies devoted to assessing the influence of profibrotic factors on the hemodynamic parameters of the LV in patients with diabetes mellitus, are rare and quite contradictory [3, 4]. The aim of the study: to identify risk factors for impaired diastolic function of the left ventricle in patients with type 1 diabetes and to evaluate their diagnostic and prognostic value in creating a model for predicting the development of diabetic cardiomyopathy.

Material and methods

All patients included in the study were diagnosed according to the "Algorithms for providing specialized medical care to patients with diabetes mellitus " . The diagnostic criteria are the presence of two or more pathological results. The categorical variables were binary, meaning that they have only two values. Since modern statistical programs work with categorical data that have

more than two values, they were transformed into dummy variables in our In the study, all categorical variables were transformed into dummy variables.

Study results

In the studied sample of patients with type 1 diabetes, LVAD was diagnosed in 13 patients. According to the results of the study of the LV relaxation function in the study participants, LVAD was detected in 7 people. When creating the logarithmic regression model, we checked and met a number of conditions. This was done both at the stage of preparation for the analysis and in the process of creating the model. Our model included independent variables that had previously shown a connection with the development of LV DD in patients with type 1 diabetes.

Discussion

In the study, the most significant prognostic factors were the presence of DCAN, changes in the level of MPP-1, the presence of the T allele of the NOS3 gene, as well as the duration of the disease, presented as a binary variable. The presented parameters are the most significant in patients with T1DM, which requires monitoring and attention from endocrinologists, cardiologists and other specialists. The accuracy of the described model is 61%, with a positive predictive value of 75.9%. The sensitivity of the model is characterized by the proportion of positive results obtained, and this affects the predicted event, with sensitivity ranging from 0 to 100%. The proportion of true negative results characterizes the specificity of the model (from 0 to 100%) [27]. A number of experts in the Russian Federation impose requirements for sensitivity indicators of 91.5% and higher, specificity of 78.0% and higher, which must be confirmed during validation in clinical trials. The mathematical model we created did not allow us to achieve the specified parameters for a number of objective reasons. reasons due to organ

restrictions of the possibilities of logarithmic regression as a data analysis method. Nevertheless, the overall accuracy of the model indicates the prospects for further research in this area.

Conclusion

Changes in MMP activity are associated with myocardial remodeling processes. MMP-1 plays a central role in the breakdown of extracellular matrix components, which contributes to structural and functional changes in the myocardium with the development of LVDD. The use of data analysis using logarithmic regression, the search for predictors of myocardial damage to determine the prognosis and outcome of the disease are currently of great practical importance.

Bibliography

1. O. M. Makhsudov. Therapeutic potential of the drug sacubitril + valsartan using the example of a patient with heart failure with preserved ejection fraction "Economy and Society" No. 10 (113) 2023
2. Dedov I.I., Shestakova M.V., Vikulova O.K. et al. Epidemiological characteristics of diabetes mellitus in the Russian Federation: clinical and statistical analysis based on data from the Federal Register of Diabetes Mellitus as of 01.01.2021. Diabetes mellitus. 2021; 24 (3): 204–221. DOI:
3. Algorithms of specialized medical care for patients with diabetes mellitus. Dedov I.I., Shestakova M.V., Mayorov A.Yu., eds. 10th ed, revised. M.; 2021 DOI: 10.14341/DM12802.
4. Complications of diabetes mellitus: treatment, prevention. Dedov I.I., Shestakova M.V., eds. M.: Medical Information Agency; 2017
5. Drapkina O.M., Gegenava B.B. Diabetes and the heart — myocardial damage in diabetic cardiomyopathy. Journal for continuous medical education of physicians. 2015;33:84–92.

6. Karavaev P.G., Veklich A.S., Koziolova N.A. Diabetic cardiomyopathy: features of cardiovascular remodeling. Russian journal of cardiology. 2019;24(11):42–47. DOI: 10.15829/1560-4071-2019-11-42-47.
7. Tatarchenko I.P., Pozdnyakova N.V. Structural and functional remodeling of the heart in diabetes mellitus: clinical and instrumental assessment. Endocrinology: news, opinions, training. 2016;3(16):94–99.
8. Jia G., Hill M.A., Sowers J.R. Diabetic Cardiomyopathy: An Update of Mechanisms Contributing to This Clinical Entity. Cir Res. 2018;122(4):624–638. DOI: 10.1161/CIRCRESAHA.117.311586.
9. Sorokina A.G., Orlova Ya.A. Modern view on the mechanisms of diabetic cardiomyopathy development and possibilities of their correction. Russian journal of cardiology. 2019;24(11):142–147. DOI: 10.15829/1560-4071-2019-11-142-147.