ISSN: 2692-5206
AMERICAN ACADEMIC PUBLISHER
INTERNATIONAL JOURNAL OF MEDICAL SCIENCES

VENTRICULAR ARRHYTHMIAS IN HEART FAILURE IN PATIENTS WITH TYPE 2 DIABETES MELLITUS

Normatov Murod Buribayevich

Uzokov Jurabek Bakhtiyorovich

Samarkand State Medical University, Samarkand, Uzbekistan

ABSTRACT: The relationship of electrophysiological and structural-functional parameters of the heart with ventricular arrhythmias in patients with diastolic heart failure with type 2 diabetes mellitus (DM2) was studied. 128 patients with DM2 and coronary heart disease with signs of CHF of functional class I—III, with a left ventricular ejection fraction of more than 50% were observed. Three groups of patients were identified: group 1 (n=55) with abnormal relaxation of the left ventricle, group 2 (n=44) — with a pseudonormal type of diastolic dysfunction, the 3rd (n=29) — with its restrictive type. Marked high frequency of complex forms of ventricular arrhythmia in group 3: ventricular extrasystole of IV—V grades (in 48.3% of patients) and grade III (in 34.5%). In diastolic dysfunction of the left ventricle of the restrictive type , delayed fragmented activity at the end of the ventricular complex was diagnosed in 72.4% of patients. A close correlation was revealed between the diastolic function of the left ventricle and the parameters of electrical remodeling of the myocardium.

Key words: Diabetes mellitus, ventricular arrhythmias, diastolic heart failure.

INTRODUCTION

The social significance of type 2 diabetes mellitus type 2 diabetes is determined by the high disability and mortality of patients from cardiovascular disorders. The risk of coronary heart disease in DM2 increases 2-4 times, the risk of acute myocardial infarction increases 6-10 times, and coronary insufficiency is often diagnosed already at the stage of severe complications in the form of sudden death or circulatory failure due to an atypical course. Coronary heart disease (CHD) is considered the leading cause of disability and increases the risk of chronic heart failure (CHF). Indicators of systolic function — an increase in the volume of the left ventricular cavity (LV) and a decrease in the ejection fraction (EF) — are independent predictors of mortality and survival in patients with CHF. In recent years, a form of heart failure with a normal ejection fraction, but impaired relaxation and LV filling, called diastolic CHF, has been isolated. The diastolic properties of the myocardium determine the functional reserve of the heart and tolerance to stress; the progression of heart failure in DM2 is possible against the background of the absence of LV dilation and normal LV. Ventricular arrhythmias are considered one of the factors provoking sudden cardiac death (SCD), however, ventricular arrhythmias at the same time are the direct cause of the development and progression of CHF. In 35-50% of cases, arrhythmic death is recorded in patients with CHF; at the same time, half of patients of functional class I—II (FC) die suddenly without an increase in signs of cardiac decompensation. For the occurrence of malignant arrhythmias, a structural pathology of the heart is necessary, and if the relationship of proarrhythmic factors with indicators of systolic dysfunction is quite clearly defined, then the role of diastolic function disorders in the formation of myocardial electrical

ISSN: 2692-5206
AMERICAN ACADEMIC PUBLISHER
INTERNATIONAL JOURNAL OF MEDICAL SCIENCES

instability remains insufficiently studied. It is necessary to analyze the mechanisms that cause a violation of electrophysiological properties and are associated with pathological electrocardiographic phenomena, ventricular arrhythmias. The purpose of the study is to study the relationship electrophysiological and structural-functional parameters of the heart with ventricular arrhythmias in patients with DM2 complicated by diastolic heart failure (CHF).

MATERIALS AND METHODS OF RESEARCH

As part of an open controlled study, 128 patients with coronary heart disease (56 men, 72 women, average age 59.9±7.4 years) with signs of CHF I—III FC according to the NYHA classification and LVLF is more than 50%, with a stable course of the disease during the previous month and a stable sinus rhythm. A prerequisite for inclusion in accordance with the protocol approved by the local ethics committee was the presence of DM2 lasting no more than 15 years under the condition of treatment with oral hypoglycemic drugs. Exclusion criteria: arterial hypertension (AH) of the 3rd degree (blood pressure above 180/110 mmHg); the presence of valvular heart defects, the presence of chronic liver and kidney failure, a cerebral stroke less than 2 years old. Written informed consent was received from each patient to participate in the study. Depending on the type of violation of LV diastolic function (DF), three groups of patients were identified: group 1 (n=55) with abnormal relaxation LV, group 2 (n=44) - with pseudonormal type of LV diastolic dysfunction (DD), group 3 (n=29) — with restrictive type of LV In addition to the standard clinical and laboratory examinations were performed, electrocardiography (ECG) in 12 leads, echocardiography (EchoCG), Holter ECG monitoring (HMECG), registration of signal-averaged ECG (SU-ECG) with the release of late ventricular potentials (PPJ), assessment of ventricular repolarization — Q—T interval dispersion (QTd), corrected Q—T interval (QTs). Echocardiography was performed on a VIVID E9 device ("GE Healthcare") in the sectoral scanning mode using color Doppler mapping, tissue Doppler, pulse and continuous wave Doppler modes. Considered structural and geometric parameters: the final diastolic size (CDR) of the LV, the final systolic size (CSR) of the LV; the final diastolic and systolic volumes (CDR and CSR) LV; LV myocardial mass index (IMM), relative wall thickness (OTC) of LV; LV systolic function: PV (%), ΔS (%). In assessing DFLF, the parameters of transmittal diastolic flow (TMDP) in early and late diastole (E, A, m/s), E/A ratio, deceleration time (DT, ms), isovolumetric relaxation time (IVRT, ms), duration of diastole (ET); blood flow at the mouth of the pulmonary veins (D, cm/s; Ar, cm/s; Adur/Ar). Tissue Dopplerography recorded the maximum velocities of the fibrous ring of the mitral and tricuspid valves: S' (cm/s) — peak systolic velocity; E' (cm/s) — peak rate of early diastolic relaxation; A' (cm/s) — peak velocity in the phase of atrial systole; ratio of the maximum rate of early filling LV (E) to the maximum velocity of the fibrous ring of the mitral valve in the early diastole (E'). To perform HMECG, the Astrocard complex (Meditek) was used, when analyzing the daily record, the following were calculated: the total duration of daily myocardial ischemia, the maximum depth of ST segment decrease, the daily number of episodes of painful and pain-free ischemia, heart rate at the beginning of ischemic episodes. Ischemic ECG changes were considered to be horizontal or descending depression of the ST segment of more than 1.5 mm at a distance of 0.08 s from the J point. at least 60 seconds, ST segment elevation by 2 mm or more. In the analysis of ventricular arrhythmias The morphology of arrhythmia, the interval of adhesion of ventricular extrasystole (IE), the relationship with exercise and ischemic episodes were studied. The SU-ECG was recorded

ISSN: 2692-5206
AMERICAN ACADEMIC PUBLISHER
INTERNATIONAL JOURNAL OF MEDICAL SCIENCES

using the software of the CARDIOVIT AT-10 device («Schiller»). The following parameters were taken into account in the time analysis: the duration of the filtered QRS complex (HF QRS-Dauer), the RMS amplitude of the last 40 ms of the QRS complex (RMS 40), the duration of low-amplitude signals at the end of the filtered QRS complex (LAH Fd). Pathological parameters HF QRS-Dauer was considered to be more than 114 ms, RMS 40 less than 25, and SU-ECG corresponding to the criteria of PPJ MV, LAH Fd is more than 38 ms. To quantify the inhomogeneity of repolarization processes, a Poly-Spectrum-8/E electrocardiograph (Neurosoft) with a Q—T interval analysis program was used. Statistical analysis was performed using standard methods of variation statistics. The variables were compared using the criterion $\chi 2$, Spearman's rank correlation coefficient (R). When evaluating the linear relationship between the values, the Pearson pair correlation coefficient (r) was calculated. The value $p<0.05$ was taken as the statistical significance of the differences.

THE RESULTS AND THEIR DISCUSSION

LC was detected in 120 (93.8%) patients, and in 68% of cases, a combination of LC with various forms of supraventricular arrhythmias (NZHD) was noted. The following data were obtained during the analysis of RE: 40 (31.25%) patients had grade I RE, 23 (20.3%) had complex forms of LPR (REIV—V grades). Polymorphic FE was registered in 33 (25.8%) cases. In patients with DM2 with restrictive type of LVDD, in comparison with similar indicators in group 1, a high frequency of complex forms was noted LC: FE IV—V grades (48.3%) and FE III grades (34.5%) ($p<0.05$). Significant differences in frequency There was no monomorphic GE II gradation between the 1st and 3rd groups. Complex forms of grade IV—V FE were less common in patients with pseudonormal type of LVHD (12.2%) compared with group 3 ($\chi 2$ =9.7; $p=0.01$). The results of individual studies indicate the effect of heart remodeling on the progression of heart failure, the occurrence of arrhythmias, and cardiovascular mortality. The morphological substrate of LV remodeling is the processes occurring at all levels of the structural organization of the heart. Molecular, cellular, interstitial changes They are clinically manifested by changes in the size, shape and functionality of the heart in response to the action of a pathological factor. The process of cardiac remodeling is influenced by hemodynamic conditions, neurohormonal activation and a number of other factors, but at the same time, the question of the mechanisms that significantly increase mortality from myocardial infarction, including sudden death on the background of LV hypertrophy, remains debatable. We evaluated the nature of ventricular arrhythmia in various variants of structural and geometric LV remodeling in patients with DM2 and CHF. Normal LV geometry was detected in 25 (19.5%) of patients, concentric and eccentric remodeling were noted in 45 (35.2%) and 50 (39%) cases, respectively, whereas concentric LV hypertrophy was isolated in 8 (6.3%) patients. It is in the 3rd group when compared with the 1st and In groups 2, the rates of eccentric remodeling and concentric LV hypertrophy were significantly higher (55.2 and 24%, respectively). There was a significant difference in the frequency of complex forms of VE III—V gradation in patients with various types of remodeling: with concentric LV hypertrophy (87.5%) and eccentric remodeling (76%) compared with patients with normal LV geometry (8%) and concentric remodeling (26.7%). In DM2 and coronary insufficiency, not only the degree of structural and geometric restructuring of the LV is important, but also the functional disorders underlying the change in the mechanical activity of the LV. At the heart of this dysfunction is a violation of contractility and elongation of cardiomyocytes, resulting in ischemic and the

ISSN: 2692-5206
AMERICAN ACADEMIC PUBLISHER
INTERNATIONAL JOURNAL OF MEDICAL SCIENCES

preserved zones differ significantly in the degree of systolic thickening and in the sequence of contraction and relaxation of myocardial fibers, which leads to kinetic asynchrony between damaged and intact sections of the LV wall and regional heterogeneity. High-resolution ECG acquired undoubted importance in risk stratification in patients. PPJ, being a reflection of fragmented delayed electrical activity, They participate in the generation of trace depolarization of one or more regions of the myocardium, which explains the data obtained by us, reflecting the peculiarities of registration of complex forms of LC. When analyzing ventricular arrhythmia and SU-ECG parameters, a pattern was revealed: polymorphic, early, paired, salvo RE were recorded significantly more often in patients with fragmented delayed activity (n=52) than in patients without BPH (n=76): 45 (86.5%) and 14 (18.4%) patients ($\chi 2=7.4$; $p=0.001$). The most common mechanism of tachyarrhythmias of high gradations is the re-entry of the pulse — the presence of unilateral and delayed conduction of the depolarization wave front due to disruption of intercellular contacts in parallel oriented fibers, heterogeneity of propagation and fragmentation of the depolarization wave front, the marker of which is PPJ. This explains the significant predominance of complex forms of FE in the group of patients with delayed fragmented ventricular activity.(86,5%). The data of the correlation analysis indicate a significant relationship between the duration of the filtered HF QRS-Dauer complex and the FE of IV—V grades ($R=0,694$; $p<0,05$). The nature of the registered LC (IE IV—V gradations) depended on the amplitude of the delayed fragmented activity of RMS40 ($R=0.5695$; $p=0.03$) and the duration of the delayed fragmented activity of LAH Fd ($R=0.5197$; $p=0.02$). It should be noted that with an increase in the degree of DF impairment, pancreatic and ventricular arrhythmias were more often recorded. In DD of the restrictive type, delayed fragmented activity at the end of the ventricular complex was diagnosed in 21 (72.4%) patients, with FE of IV—V grades noted in 14 (48.3%) patients, III grades — in 34.5% of cases. With type II DD (pseudonormal type) PPV was isolated in 24 (54.5%) patients, while it was in patients with pathological indicators of ECG that complex forms of FE — 8 (18.2%) were detected, Housing grade III — 11 (25%). The analysis of myocardial ischemia during daily monitoring allowed us to establish a significant difference in the number of episodes of ischemic ST segment displacement in patients of group 3 (4.1±0.5) and group 1 (2.6±0.4) and group 2 (3.3±0.5) ($p<0.05$). In patients with restrictive type of LVDD, the total duration of ischemic pain episodes (BEIM) slightly exceeded the specified parameter in the other two groups. A significant difference ($p<0.03$) was noted when assessing the total duration of pain-free myocardial ischemia (BIM) per day (21.8±1.8 min) in groups 3 and 1 (11.3±0.7 min). A significant difference in this indicator also occurred between the 2nd (15.3±1.2 min) and the 1st groups ($p<0.05$). The results of our study suggest that the progression of DD contributes to the fragmentation of the depolarization process, which is associated with the heterogeneity of activation of preserved myocardial fibers separated by fibrous

with a cloth. In areas of myocardial dysfunction, electrophysiological alternation of cells and their membranes associated with remodeling after episodes of ischemia and/or myocardial infarction contributes to the development of "electromechanical inconsistency". The phenomenon of instability of the electrophysiological properties of the myocardium can serve as a marker QTd; an increase in QTd is associated with an increased risk of dangerous arrhythmias in patients who have suffered an acute myocardial infarction. We studied the temporal repolarization of the ventricles of the QT and QTd in patients with DM2 with CHF with various variants of DFLH disorders. The difference in QTd between the groups with different types of diastolic disorders was established, however, the most significant

ISSN: 2692-5206
AMERICAN ACADEMIC PUBLISHER
INTERNATIONAL JOURNAL OF MEDICAL SCIENCES

difference was in the indicator for the restrictive type of LV DD from that for abnormal LV relaxation (68.2±2.1 ms and 51.7±2.7 ms, respectively; p=0.001). In the group with a restrictive type of DD, it is significant the proportion of patients with a QTc interval of more than 440 ms (n=19; 65.5%) and QTd of more than 50 ms (n=21; 72.4%) than in patients with pseudonormal type DDLV 15 (34%) and 18 (41%), respectively. When comparing QTd in patients with DM2 with various types of LC, it turned out that the quantitative value of QTd increases depending on the increase in the severity of arrhythmias: higher values were detected in patients with high grades of IE, runs of ventricular tachycardia. The average QTd values in patients without LC (n=8) were 36.3±2.4 ms, whereas in patients with LC IV—V gradations (n=26) — 74.5± 3.1 ms. A significant difference in QTd values was obtained between patients with LC of grade I (n=40) and patients with LC III (n=33) and IV—V grades (n=26) (38,9±2,9, 56,3±2,4 and 74.5±3.1 ms; p<0.05). A correlation between QTd and RE has been established IV—V grades (R=0.652; p=0.001). A correlation was found between the dispersion of the Q—T interval and the parameters of the SU-ECG: the amplitude of fragmented RMS activity (R=0.496; p<0.05), the duration of LAH Fd (R=0.531; p<0.02); the duration of the filtered QRS complex HF QRS-Dauer (R=0.546; p=0.03). functional changes of cardiomyocytes in conditions of acute and chronic ischemia, specific structural changes myocardium in patients with DM creates conditions for changing the processes of repolarization and the appearance of delayed fragmented ventricular activity. It is precisely the inhomogeneity of the electrophysiological properties of the myocardium, accompanying the formation of a myocardial arrhythmogenic substrate in patients with DM with LVD, that can explain the correlation of the QT interval variance with the parameters of the SU-ECG (ventricular extrasystole of high gradations).

CONCLUSIONS

The study showed that in patients with DM2 complicated by heart failure, it is necessary to assess the severity of impaired diastolic function, indicators of structural and geometric and electrophysiological remodeling of the left ventricle. The progression of diastolic dysfunction in conditions of persistent and/or increasing manifestations of chronic coronary insufficiency contributes to the electrophysiological alternation of cells and their membranes, the development of "electromechanical inconsistency" in areas of myocardial dysfunction. In the presence of chronic myocardial ischemia in conditions of deficiency of macroergic compounds, the rigidity of its walls increases, which in turn leads to a slowdown in the process of early diastolic relaxation of the left ventricle. The inhomogeneity of the wave of myocardial repolarization and depolarization, which occurs in areas of limited coronary blood supply, creates conditions for the circulation of the excitation wave and the development of life-threatening cardiac arrhythmias, i.e. an increased risk of arrhythmogenic death. A close correlation was revealed between the diastolic function of the left ventricle and the indicators of electrical remodeling of the myocardium.

LITERATURE

1. Uzokov, J. B., Khusainova, M. A., Eshmamatova, F. B., & Mamadiyorova, M. M. (2023). Correction of violations rheology of blood in ischemic heart disease. *Science and Education*, *4*(2), 153-159.
2. Khaydarov, S. N., Khusainova, M. A., Uzokov, J. B., & Makhmudova, K. D. (2023). Heart failure and the risk of hypoglycemia. *Science and Education*, *4*(5), 222-231.

ISSN: 2692-5206
AMERICAN ACADEMIC PUBLISHER
INTERNATIONAL JOURNAL OF MEDICAL SCIENCES

3. Khusainova, M. A., Khaydarov, S. N., Uzokov, J. B., & Karabayeva, G. K. (2023). KIDNEY CONDITION IN PATIENTS WITH CHRONIC HEART FAILURE. *Oriental renaissance: Innovative, educational, natural and social sciences*, *3*(2), 102-112.
4. Uzokov, J. B., Khusainova, M. A., Bekmuradova, M. S., & Makhmudova, K. D. (2023). Dynamics of quality of life indicators during personalized rehabilitation of patients with rheumatoid arthritis with arterial hypertension. *Science and Education*, *4*(5), 196-204.
5. Khusainova, M. A., Bekmuradova, M. S., Makhmudova, K. D., & Uzokov, J. B. (2023). Echocardiographic changes of the left ventricle in bronchial asthma. *Science and Education*, *4*(5), 214-221.
6. Khusainova, M. A., Khaydarov, S. N., Uzokov, J. B., & Shonazarova, N. K. (2023). QUALITY OF LIFE IN PATIENTS WITH CHOLELITHIASIS IN THE LONG-TERM PERIOD AFTER CHOLECYSTECTOMY. *Oriental renaissance: Innovative, educational, natural and social sciences*, *3*(2), 231-239.
7. Khusainova, M. A., Gafforov, K. K., Uzokov, J. B., & Tairova, Z. K. (2023). THE CHANGE IN THE QT INTERVAL IS A MARKER OF THE SEVERITY OF LIVER CIRRHOSIS. *Oriental renaissance: Innovative, educational, natural and social sciences*, *3*(2), 94-101.
8. Rustamovich, T. D., Alisherovna, K. M., Baxtiyorovich, U. J., & Abdurakhmonovich, M. M. (2022). Painless Cardiac Ischemia in Women with Rheumatoid Arthritis. *Texas Journal of Medical Science*, *13*, 95-98.
9. Alisherovna, K. M., Rustamovich, T. D., Baxtiyorovich, U. J., & Sobirovna, S. M. (2022). Diabetes Mellitus and Hyperglycemia in Patients with Rheumatoid Arthritis. *Texas Journal of Medical Science*, *13*, 99-103.
10. Alisherovna, K. M., Rustamovich, T. D., & Baxtiyorovich, U. J. (2022). The Use of Trimetazidine in Patients with Type 2 Diabetes Mellitus Who Have Suffered a Myocardial Infarction. *Czech Journal of Multidisciplinary Innovations*, *10*, 35-41.
11. Khabibovna, Y. S., Alisherovna, K. M., Tashtemirovna, E. M. M., & Baxtiyorovich, U. J. (2023). THE EFFECTIVENESS OF THYROSTATICS IN THE TREATMENT OF. *Journal of new century innovations*, *29*(1), 79-88.
12. Alisherovna, K. M., Akramovna, I. K., Bakhtiyorovich, U. J., Nizamitdinovich, K. S., Jasurovna, J. S., Kairatovna, R. A., & Abdukholikovna, E. S. (2023). Exacerbations of chronic obstructive pulmonary disease and coronary atherosclerosis. *Journal of new century innovations*, *39*(1), 176-178.
13. Baxtiyorovich, U. J., Alisherovna, K. M., & Mamasoliyevna, D. N. (2023). Features of cognitive impairment in patients with chronic kidney disease at predialysis stages. *World Bulletin of Public Health*, *22*, 49-54.
14. Alisherovna, K. M., Khabibovna, Y. S., Nizamitdinovich, K. S., & Bakhtiyorovich, U. J. (2023). CYSTATIN and KIDNEY FUNCTION. *Journal of new century innovations*, *38*(2), 220-225.
15. Bakhtiyorovich, U. J. (2024). METABOLISM REGULATOR IN PATIENTS WITH CHRONIC HEART FAILURE AND ANEMIA OF CHRONIC DISEASES. *Journal of new century innovations*, *45*(3), 3-12.
16. Bakhtiyorovich, U. J. (2024). FEATURES OF THE COGNITIVE STATUS IN WOMEN WITH IRON DEFICIENCY ANEMIA. *Spectrum Journal of Innovation, Reforms and Development*, *24*, 27-32.
17. Erkinovna, K. Z., Alisherovna, K. M., Bakhtiyorovich, U. J., & Djamshedovna, K. D. (2023). METABOLIC SYNDROME IN RHEUMATOID ARTHRITIS. *Journal of new century innovations*, *38*(2), 203-211.

ISSN: 2692-5206
AMERICAN ACADEMIC PUBLISHER
INTERNATIONAL JOURNAL OF MEDICAL SCIENCES

18. Alisherovna, K. M., Nizamitdinovich, K. S., Bakhtiyorovich, U. J., & Khudoyberdiyevna, S. N. QUALITY OF LIFE IN PATIENTS WITH CHOLELITHIASIS IN THE LONG-TERM PERIOD AFTER CHOLECYSTECTOMY.
19. Alisherovna, K. M., Nizamitdinovich, K. S., Bakhtiyorovich, U. J., & Khudayberdiyevna, K. G. KIDNEY CONDITION IN PATIENTS WITH CHRONIC HEART FAILURE.
20. Yarmukhamedova, S., Nazarov, F., Mahmudova, X., Vafoeva, N., Bekmuradova, M., Gaffarov, X., ... & Xusainova, M. (2020). Features of diastolic dysfunction of the right ventricle in patients with hypertonic disease. *Journal of Advanced Medical and Dental Sciences Research*, *8*(9), 74-77.
21. Xaydarov, S. N., & Normatov, M. B. (2021). DETERMINATION OF IRON DEFICIENCY ANEMIA AT THE PREGNANCY PERIOD. *Scientific progress*, *2*(4), 325-327.
22. Yarmukhamedova, S., Nazarov, F., Mahmudova, X., Vafoeva, N., Bekmuradova, M., Gafarov, X., ... & Xusainova, M. (2020). Study of indicators of intracardial hemodynamics and structural state of the myocardium in monotherapy of patients with arterial hypertension with moxonidin. *Journal of Advanced Medical and Dental Sciences Research*, *8*(9), 78-81.
23. Normatov, M. B. (2023). Features of management of patients with chronic heart failure and diabetes mellitus. *Science and Education*, *4*(5), 251-259.
24. Khabibovna, Y. S., & Buribaevich, N. M. (2020). Study Of Parameters Of Central Hemodynamics In Patients With Chronic Glomerulonephritis. *Достижения науки и образования*, (13 (67)), 57-59.
25. Buribayevich, N. M. (2022). Treatment of Chronic Heart Failure in Patients with Type 2 Diabetes Mellitus. *Central Asian Journal of Medical and Natural Science*, *3*(1), 183-186.
26. Buribayevich, N. M. (2022). DIASTOLIC DYSFUNCTION AND REMODELING LEFT VENTRICLE DEPENDING ON THE CONTROL GLYCEMIA IN PATIENTS WITH TYPE 2 DIABETES MELLITUS. *Spectrum Journal of Innovation, Reforms and Development*, *7*, 96-100.
27. Buribayevich, N. M. (2022). FEATURES OF MANAGEMENT OF PATIENTS WITH CHRONIC HEART FAILURE AND DIABETES MELLITUS. *Spectrum Journal of Innovation, Reforms and Development*, *10*, 263-269.
28. Khabibovna, Y. S., & Buriboevich, N. M. (2021). Change Of Structural And Functional Heart Indicators In Patients With Diabetes Mellitus With Diastolic Heart Failure.
29. Khabibovna, Y. S., Alisherovna, K. M., Nizamitdinovich, K. S., & Totlibayevich, Y. S. (2023). Features of heart failure in patients with thyrotoxicosis. *Journal of new century innovations*, *29*(1), 89-97.
30. Khabibovna, Y. S., Alisherovna, K. M., Tashtemirovna, E. M. M., Nizamitdinovich, K. S., & Abdukadirovna, A. S. (2023). ANTITHROMBOTIC THERAPY IN CARDIOLOGICAL PATIENTS. *Journal of new century innovations*, *39*(1), 169-171.
31. Khabibovna, Y. S., Alisherovna, K. M., Totlibayevich, Y. S., & Davranovna, M. K. (2023). PAINLESS CARDIAC ISCHEMIA AND RHEUMATOID ARTHRIT. *Journal of new century innovations*, *29*(1), 98-105.
32. Khabibovna, Y. S., Alisherovna, K. M., Nizamitdinovich, K. S., Tashtemirovna, E. M. M., Abdukadirovna, A. S., & Jasurovna, J. S. (2023). DEPRESSION, ANXIETY AND QUALITY OF LIFE IN PATIENTS WITH ATRIAL FIBRILLATION. *Journal of new century innovations*, *39*(1), 185-189.

ISSN: 2692-5206
AMERICAN ACADEMIC PUBLISHER
INTERNATIONAL JOURNAL OF MEDICAL SCIENCES

33. Khabibovna, Y. S., Alisherovna, K. M., Erkinovna, K. Z., & Djamshedovna, K. D. (2023). Gender Characteristics of the Course of Rheumatoid Arthritis. *Miasto Przyszłości*, *40*, 438-442.
34. Tashtemirovna, E. M. M., Khabibovna, Y. S., Alisherovna, K. M., & Erkinovna, K. Z. (2023). Angiopathy in Rheumatoid Arthritis. *Miasto Przyszłości*, *40*, 418-425.
35. Khabibovna, Y. S., & Alisherovna, K. M. (2024). STRESS TESTING IN PATIENTS WITH CORONARY HEART DISEASE. *Journal of new century innovations*, *45*(3), 28-33.
36. Khabibovna, Y. S., & Xudoyberdiyevich, G. X. (2024). THE POSSIBILITIES OF COENZYME Q10 AS PART OF THE COMPLEX THERAPY OF PATIENTS WITH CHRONIC HEART FAILURE. *Spectrum Journal of Innovation, Reforms and Development*, *25*, 116-123.
37. Yarmukhamedova, S. K., Alisherovna, K. M., Tashtemirovna, E. M. M., & Nizamitdinovich, K. S. (2023). The Effectiveness of Trimetazidine in Arrhythmias. *Miasto Przyszłości*, *33*, 215-221.
38. Yarmukhamedova, S. K., & Gafforov, X. X. (2024). Indicators of daily blood pressure monitoring in patients with osteoarthritis with cardiovascular disorders in case of metabolic syndrome. *Science and Education*, *5*(4), 50-55.
39. Alisherovna, K. M., Ismatullayevich, M. A., & Nuriddinovna, E. N. (2024). FEATURES OF HEART FAILURE IN PATIENTS WITH CORONARY HEART DISEASE AND THYROTOXICOSIS. *Ta'lim innovatsiyasi va integratsiyasi*, *19*(4), 52-61.
40. Alisherovna, K. M., Habibulloyevna, I. M., & Voxidovna, R. F. (2024). STRUCTURAL AND FUNCTIONAL FEATURES OF THE LEFT VENTRICLE IN PATIENTS WITH HEART FAILUREIN ISCHEMIC HEART DISEASE AND THYROTOXICOSIS. *Ta'lim innovatsiyasi va integratsiyasi*, *19*(4), 71-81.
41. Alisherovna, K. M., Erkinovna, S. D., Yazdonkulovna, X. M., & Zafarovna, C. M. M. (2024). ATRIAL FIBRILLATION IN THYROTOXICOSIS–DETERMINANTS OF DEVELOPMENT AND CONSERVATION. *Ta'lim innovatsiyasi va integratsiyasi*, *19*(4), 103-113.
42. Alisherovna, K. M., Yaxshiboyevich, U. M. R., & Yigitaliyevich, B. A. (2024). EVALUATION OF A NATRIURETIC PEPTIDE TO OPTIMIZE THE MANAGEMENT OF COMORBID PATIENTS WITH THYROTOXICOSIS AND HEART FAILURE. *Ta'lim innovatsiyasi va integratsiyasi*, *19*(4), 62-70.
43. Alisherovna, K. M., Erkinovna, S. D., Duskobilovich, B. S., & Samandarovich, T. H. (2024). ARTERIAL HYPERTENSION IN THYROTOXICOSIS AND REMODELING OF THE LEFT VENTRICLE OF THE HEART. *Ta'lim innovatsiyasi va integratsiyasi*, *19*(4), 114-121.
44. Alisherovna, K. M., Akramovna, I. K., & Yorkinovna, E. N. (2024). CLINICAL AND MORPHOLOGICAL CRITERIA OF COLITIS IN PATIENTS WITH CHRONIC ISCHEMIC DISEASE OF THE DIGESTIVE SYSTEM. *Ta'lim innovatsiyasi va integratsiyasi*, *18*(6), 6-13.
45. Alisherovna, K. M., Akramovna, I. K., & Baxtiyorovna, O. K. (2024). THE COURSE OF CHRONIC ISCHEMIC PANCREATITIS IN PATIENTS WITH CORONARY HEART DISEASE. *Ta'lim innovatsiyasi va integratsiyasi*, *18*(5), 231-239.
46. Alisherovna, K. M., Akramovna, I. K., & Kairatovna, R. A. (2024). THE EFFECTIVENESS OF TREATMENT OF PATIENTS WITH OSTEOARTHRITIS WITH CARDIOVASCULAR DISORDERS IN METABOLIC SYNDROME. *Ta'lim innovatsiyasi va integratsiyasi*, *18*(5), 223-230.

ISSN: 2692-5206
AMERICAN ACADEMIC PUBLISHER
INTERNATIONAL JOURNAL OF MEDICAL SCIENCES

47. Alisherovna, K. M., Davranovna, M. K., & Erkinovna, K. Z. (2024). CORONARY HEART DISEASE AND OSTEOPOROSIS IN POSTMENOPAUSAL WOMEN. *Spectrum Journal of Innovation, Reforms and Development*, *26*, 40-45.
48. Alisherovna, K. M., Mansurovna, M. D., Erkinovna, N. D., Farxodovna, X. R., Toxirovna, M. M., Tolibovna, R. D., & Yorkinovna, E. N. (2024). ARTERIAL HYPERTENSION AND THYROID STATUS IN PATIENTS OF DIFFERENT AGES. *Ta'lim innovatsiyasi va integratsiyasi*, *19*(4), 122-129.
49. Davranovna, M. K. D. K., Alisherovna, K. M., & Erkinovna, K. Z. (2024). CARDIAC ARRHYTHMIAS IN PATIENTS WITH RHEUMATOID ARTHRITIS. *Spectrum Journal of Innovation, Reforms and Development*, *26*, 65-71.
50. Erkinovna, K. Z., Alisherovna, K. M., & Davranovna, M. K. (2024). ARTERIAL HYPERTENSION AND ARRHYTHMIA. *Spectrum Journal of Innovation, Reforms and Development*, *26*, 72-78.
51. Nizamitdinovich, K. S., Alisherovna, K. M., & Erkinovna, K. Z. (2024). ASSESSMENT OF THE RISK OF DEVELOPING DIABETES MELLITUS FOR MEN. *Spectrum Journal of Innovation, Reforms and Development*, *26*, 114-123.
52. Alisherovna, K. M., Nizamitdinovich, K. S., & Erkinovna, K. Z. (2024). THE EFFECTIVENESS OF BISOPROLOL AND METFORMIN IN ARTERIAL HYPERTENSION AND METABOLIC SYNDROME. *Spectrum Journal of Innovation, Reforms and Development*, *26*, 106-113.
53. Akramovna, I. K., & Alisherovna, K. M. (2024). CAUSES OF ARRHYTHMIA DURING PREGNANCY. *Journal of new century innovations*, *45*(3), 34-41.