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VENTRICULAR RATE AND BLOOD PRESSURE ORTHOSTATIC REACTIONS IN PATIENTS WITH PERMANENT ATRIAL FIBRILLATION IN GENERAL CARDIOVASCULAR RISK GROUPS

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Types and prevalence of ventricular rate (VR), systolic (SBP) and diastolic (DBP) blood pressure (BP) orthostatic reactions (OR) in patients with permanent atrial fibrillation (AF) in general cardiovascular risk groups (GCVR) were studied in 137 patients (73 men and 64 women), aged 66.4 ± 9.9 years. VR was measured by the electrocardiography (ECG) on the computer electrocardiograph «CardioLab 2000» and BP – semi-automatic tonometer Microlife BP2BIO. Changes VR, SBP and DBP in the range of $\pm 5\%$ were classified as a lack, an increase of 5% and more – both positive and decreased by 5% or more – as a negative OR. GCVR calculated in accordance with the scale of SCORE. Patients were classified into groups of GCVR. Statistical evaluation of the results was performed with the parametric estimate of the mean (M) and standard deviation (sd) and non-parametric Student's T-test and Mann-Whitney test methods.

It was found that patients with AF have all three types (positive, absent, negative) OR of VR, SBP and DBP, which are stored in all classes GCVR. Optimizing the management of patients with atrial fibrillation, including with and through modification within the GCVR risk factors should take into account deviations in orthostatic reactions of VR, SBP and DBP.

KEY WORDS: orthostatic reaction, atrial fibrillation, general cardiovascular risk

ОРТОСТАТИЧНІ РЕАКЦІЇ ЧАСТОТИ ШЛУНОЧКОВИХ СКОРОЧЕНЬ ТА АРТЕРІАЛЬНОГО ТИСКУ У ПАЦІЄНТІВ З ПОСТІЙНОЮ ФІБРИЛЯЦІЄЮ ПЕРЕДСЕРДЬ У ГРУПАХ ЗАГАЛЬНОГО КАРДІОВАСКУЛЯРНОГО РИЗИКУ

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Вивчено типи і поширеність ортостатичних реакцій (ОР) частоти шлуночкових скорочень (ЧШС), систолічного (САТ) і діастолічного (ДАТ) артеріального тиску (АТ) у пацієнтів з постійною формою фібриляції передсердь (ФП) в групах загального кардіоваскулярного ризику (ЗКВР) на 137 пацієнтах (73 чоловіки і 64 жінки) віком $66,4 \pm 9,9$ років. ЧШС вимірювали по ЕКГ на комп'ютерному електрокардіографі «CardioLab 2000» та АТ – напівавтоматичним тонометром Microlife BP2BIO. Зміни ЧШС, САТ і ДАТ в діапазоні до $\pm 5\%$ класифікували як відсутність, збільшення на 5% і більше – як позитивні і зниження на 5% і більше – як негативні ОР. ЗКВР розраховували відповідно до шкали SCORE. Пацієнтів класифікували на групи ЗКВР. Статистична оцінка результатів проводилася параметричними з оцінкою середнього (М) і стандартного відхилення (sd) і непараметричними t-критерію Стьюдента та критерію Манна-Уїтні методами.

Встановлено, що у пацієнтів з ФП існують всі три типи (позитивні, відсутні, негативні) ортостатичні реакції ЧШС, САТ і ДАТ, які зберігаються у всіх класах ЗКВР. Оптимізація ведення пацієнтів з ФП, в тому числі з урахуванням і через модифікацію входять до ЗКВР факторів ризику повинна здійснюватися з урахуванням ухилень в ортостатичних реакціях ЧШС, САТ і ДАТ.

КЛЮЧОВІ СЛОВА: ортостатична реакція, фібриляція передсердь, загальний кардіоваскулярний ризик

ОРТОСТАТИЧЕСКИЕ РЕАКЦИИ ЧАСТОТЫ ЖЕЛУДОЧКОВЫХ СОКРАЩЕНИЙ И АРТЕРИАЛЬНОГО ДАВЛЕНИЯ У ПАЦИЕНТОВ С ПОСТОЯННОЙ ФИБРИЛЛЯЦИЕЙ ПРЕДСЕРДИЙ В ГРУППАХ ОБЩЕГО КАРДИОВАСКУЛЯРНОГО РИСКА

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Изучены типы и распространенность ортостатических реакций (ОР) частоты желудочковых сокращений (ЧЖС), систолического (САД) и диастолического (ДАД) артериального давления (АД) у пациентов с постоянной формой фибрилляции предсердий (ФП) в группах общего кардиоваскулярного риска (ОКВР) на 137 пациентах (73 мужчины и 64 женщины) в возрасте $66,4 \pm 9,9$ лет. ЧЖС измеряли по ЭКГ на компьютерном электрокардиографе «CardioLab 2000» и АД - полуавтоматическим тонометром Microlife BP2BIO. Изменения ЧЖС, САД и ДАД в диапазоне до $\pm 5\%$ классифицировали как отсутствие, увеличение на 5% и более – как позитивные и снижение на 5% и более – как негативные ОР. ОКВР рассчитывали в соответствии со шкалой SCORE. Пациентов классифицировали на группы ОКВР. Статистическая оценка результатов проводилась параметрическими с оценкой среднего (M) и стандартного отклонения (sd) и непараметрическими t-критерия Стьюдента и критерия Манна-Уитни методами.

Установлено, что у пациентов с ФП существуют все три типа (позитивные, отсутствующие, негативные) ортостатические реакции ЧЖС, САД и ДАД, которые сохраняются во всех классах ОКВР. Оптимизация ведения пациентов с ФП, в том числе с учетом и через модификацию входящих в ОКВР факторов риска должна осуществляться с учетом уклонений в ортостатических реакциях ЧЖС, САД и ДАД.

КЛЮЧЕВЫЕ СЛОВА: ортостатическая реакция, фибрилляция предсердий, общий кардиоваскулярный риск

INTRODUCTION

Atrial fibrillation (AF) - the most common type of arrhythmia, which is a serious medical and social problem due to the high rate of complications [1-2] and hospitalizations [3].

Orthostatic reaction (OR) of ventricular contractions rate (VR) and blood pressure (BP) is an objective method for assessing autonomic regulation of the cardiovascular system of the person and have an independent prognostic value for the course and outcomes of various cardiovascular diseases. For example, blood pressure hypotensive OR associated with the risk of acute coronary syndrome [4], izotensive – with a worsening of arterial hypertension [5]. The most favorable are considered hypertensive OR of BP. However, there is evidence of increased risk of «silent» strokes in patients with this type of OR [6–7].

We have not found studies on OR of VR and BP depending on the general cardiovascular risk (GCVR) in patients with AF.

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OBJECTIVE

Aim of the research is to study of prevalence of VR and BP OR in patients with permanent AF in GCVR groups for development proposals for increase of the effectiveness of its diagnosis and therapy.

MATERIALS AND METHODS

On the basis of cardiology department of the central hospital «Ukrzaliznytsia» and city polyclinic № 6 137 patients (73 men and 64 women aged $66,4 \pm 9,9$ years) with permanent AF barred from 1 to 25 years were examined. Arterial hypertension (AH) was diagnosed in 114 patients, coronary artery disease (CAD) – in 67 patients, post-myocardial infarction cardio sclerosis (PICS) – in 15 patients, heart failure (HF) – in 121 patients.

Exclusion criteria were patients with stable exertional angina IV functional class (FC), acute coronary syndrome, valvular disease and heart failure FC IV.

OR of VR evaluated according to its measurement in tilt test on third minute of clinostasis and third minute after switching in orthostasis on the computer electrocardiograph «CardioLab 2000». Changes of VR in the range of $\pm 5\%$ was classified as a lack, an increase of 5% or more – as a positive and a decrease of 5% or more – as a negative VR OR.

Systolic blood pressure (SBP) and diastolic blood pressure (DBP) were measured by the method of Korotkov with semi-automatic tonometer Microlife BP2BIO in tilt test on third minute of clinostasis and third minute after switching in orthostasis. Hypertensive (blood pressure increase of more than 5%), izotensive (changes in blood pressure to within $\pm 5\%$) and hypotensive (blood pressure reduction by 5% or more) BP OR were recovered.

GCVR calculated in accordance with the scale SCORE [8]. As a result of the patients were classified into 4 groups GCVR: 1 – low (risk SCORE < 1 %); 2 – moderate (risk SCORE > 1 % and < 5 %); 3 – high (risk SCORE > 5 % and < 10 %) and 4 – very high risk (SCORE > 10 %).

The data is entered into Microsoft Excel database 2010. Statistic evaluation of the results was performed by parametric methods to estimate the mean (M) and standard

deviation (sd) and non-parametric Student's T-test and Mann-Whitney test.

RESULTS AND DISCUSSION

Initially VR in all GCVR groups did not differ significantly and conform to tachysystolic AF (Fig. 1). Its value was higher in groups II and III of GCVR (97 and 96 beats/min, respectively) versus groups I and IV GCVR (91 and 90 beats/min, respectively).

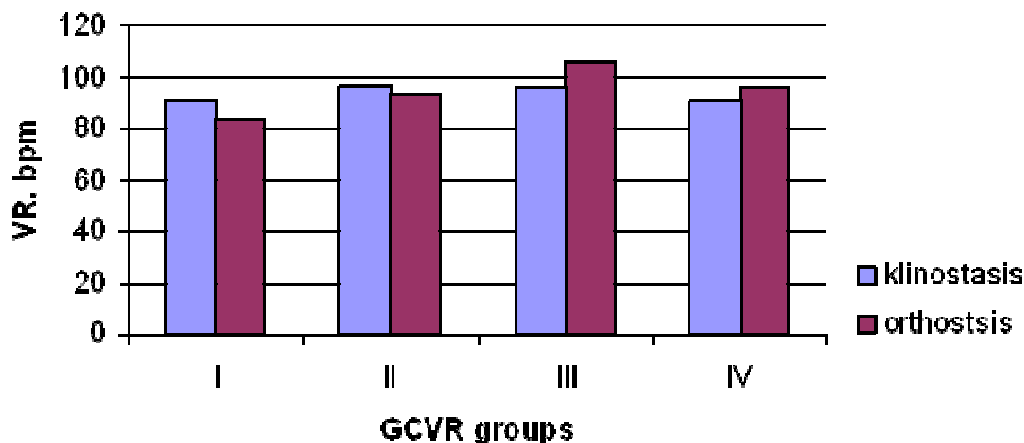


Fig. 1. Ventricular rate orthostatic reactions in patients with permanent AF in GCVR groups

The tilt test in I and II GCVR groups observed moderate nonsignificant VR reduction, more pronounced in the group I (8 % versus 4 %). In III and IV GCVR groups there was a significant ($p \leq 0,05$) VR increase more in group III (10 % vs. 5 %, respectively) in orthostasis.

The initial values of BP and orthostatic changes are shown in Fig. 2. Starting SBD did not differ significantly between the I-III GCVR groups, but was significantly higher in them against values in IV group GCVR ($p \leq 0,01$). In orthostasis in all this GCVR groups is not significantly changed, and only in the group IV significantly decreased by 7 % ($p \leq 0,01$).

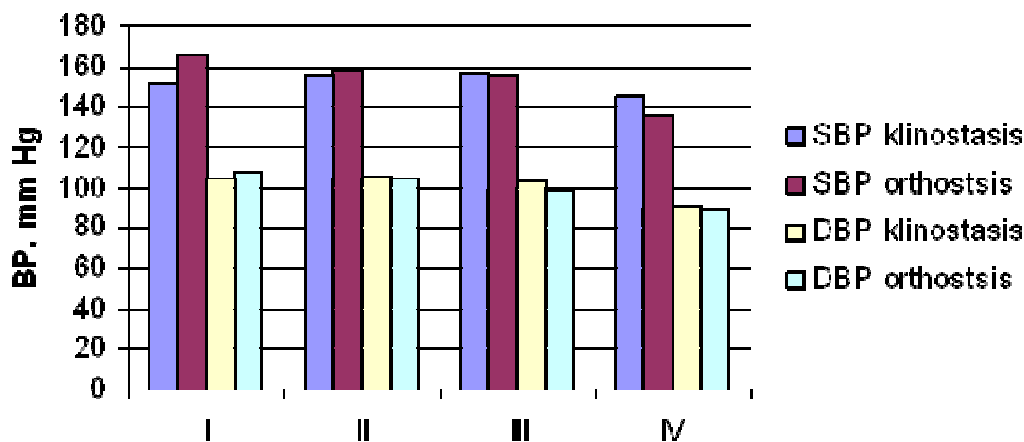


Fig. 2. Systolic and diastolic blood pressure orthostatic reactions in patients with permanent AF in GCVR groups

Initial values of DBP in I-III GCVR groups were almost identical and significantly lower than in group IV ($p \leq 0,01$). In orthostasis occurred nonsignificant increase of DBP in I and IV

GCVR groups and slide – in groups II and III.

Table presents the ratio of types of VR and BP OR in GCVR groups. In I GCVR group, the frequency of different types of VR OR distributed equally.

Table

Frequency ratio of blood pressure orthostatic reactions in patients with permanent AF in GCVR groups (%)

Functional values orthostatic reactions		GCVR			
		I	II	III	IV
VR	absent	33,3	39	13	20
	positive	33,3	26	65	64
	negative	33,3	35	22	16
SBP	absent	0	26	17	15
	positive	33	26	61	64
	negative	67	48	22	21
DBP	absent	0	26	43	14
	positive	67	26	39	29
	negative	33	48	18	57

In II GCVR group equally prevailed absent and negative VR OR, in groups III and IV prevailed positive VR OR.

In I and II GCVR groups dominated hypertensive SBP OR. Thus hypotensive SBP OR in I group GCVR was not observed and was similar to izotensive SAD OR frequency in II GCVR group. In III and IV GCVR groups it was the highest frequency of izotensive SBP OR at least the same rate of hypotensive SBP OR and the same intermediate frequency hypertensive SBP OR in both groups.

The frequency distribution of DBP OR corresponds to the frequency allocation of SBP OR only in II GCVR group, where the maximum rate remained hypertensive and were lower and the same frequency of hypotensive and izotensive DBP OR. In the I GCVR group was the maximal frequency izotensive DBP OR and, as in the case of SBP OR, not observed hypotensive DBP OR. In III GCVR group equally predominant frequency of hypo- and izotensive DBP OR with a minimal frequency of hypertensive DBP OR. In IV GCVR group most

frequently met hypertensive and least often - hypotensive DBP OR.

The findings not only confirm the existence of patients with AF different types of VR OR, but a SBP and DBP [9-10], which are frequency characteristics are close to those of patients with sinus rhythm [11].

The value of the negative and missing VR OR in adverse outcomes and established the existence of SBP and DBP OR in patients with AF in different frequency ratios in GCVR groups puts the task of studying the possibility of their optimization to improve the quality and duration of life for patients. Such intervention is required in all groups of GCVR.

CONCLUSIONS

In patients with AF, there are three types (positive, absent, negative) VR, SBP and DBP OR, which are stored in all GCVR groups.

Optimizing the management of patients with atrial fibrillation, including with and through GCVR factors modification should take into account deviations in VR, SBP and DBP OR.

PROSPECTS FOR FUTURE STUDIES

It seems appropriate to study the functional values of cardiovascular system,

as well as VR control results in patients with AF in different GCVR groups.

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