

## Clinical researches

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### CLINICAL FEATURES OF PATIENTS WITH PERMANENT PACEMAKERS DEPENDING ON THE STAGE OF ARTERIAL HYPERTENSION

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The study included 131 patients (70 men and 61 women) aged  $69,5 \pm 11,6$  years who underwent permanent pacing because of atrio-ventricular block(AV), permanent atrial fibrillation(AF) and sick sinus node syndrome(SSS) with pacing modes DDD/DDDR and VVI /VVIR as well as chronic heart failure (CHF) with cardiac resynchronization therapy (CRT-P and CRT-D). Clinical features of patients were evaluated according to the stage of arterial hypertension (AH). The results showed that all patients with implanted pacemakers had hypertension the II and III stages with their ratio 1:2.5. Stable angina, diabetes mellitus (DM), AF, heart failure (HF) II A and moderate degree of AH were associated with the II stage of AH. The III stage of AH was associated with persistent AF and postinfarction cardiosclerosis, while the frequency of occurrence moderate and severe degree of AH were the same. The high frequency of AH in patients with implanted pacemakers and their relationship with other disorders in the health of patients, requires optimization of blood pressure control.

**KEY WORDS:** permanent pacing, arterial hypertension

### КЛІНІЧНІ ОСОБЛИВОСТІ ПАЦІЄНТІВ З ПОСТІЙНОЮ ЕЛЕКТРОКАРДІОСТИМУЛЯЦІЄЮ В ЗАЛЕЖНОСТІ ВІД СТАДІЇ АРТЕРІАЛЬНОЇ ГІПЕРТЕНЗІЇ

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Обстежені 131 пацієнт (70 чоловіків і 61 жінка) у віці  $69,5 \pm 11,6$  років, які піддалися постійній електрокардіостимуляції (ЕКС) з приводу атріо-вентрикулярної блокади, постійної форми фібриляції передсердь і синдрому слабкості синусового вузла з режимами стимуляції DDD/DDDR і VVI /VVIR, а також хронічної серцевої недостатності (ХСН) з кардіоресінхронізуючою терапією (CRT-P і CRT-D). Клінічні ознаки пацієнтів оцінювалися в залежності від стадії артеріальної гіпертензії (АГ). Результати показали, що всі пацієнти з імплантованими ЕКС мали АГ II і III стадій з їх співвідношенням 1:2,5. АГ II стадії частіше асоціювалася зі стабільною стенокардією, СД, ФП, ХСН II А та помірним ступенем АГ, АГ III стадії - з постійною формою ФП і постінфарктним кардіосклерозом, при цьому частоти помірною та важкою ступенів АГ в них була однакова. Висока частота зустрічальності у пацієнтів з імплантованими ЕКС АГ високих стадій та їх зв'язок з іншими порушеннями в стані здоров'я пацієнтів вимагає оптимізації медикаментозного контролю АТ.

**КЛЮЧОВІ СЛОВА:** постійна електрокардіостимуляція, артеріальна гіпертензія

### КЛИНИЧЕСКИЕ ОСОБЕННОСТИ ПАЦИЕНТОВ С ПОСТОЯННОЙ ЭЛЕКТРОКАРДИОСТИМУЛЯЦИЕЙ В ЗАВИСИМОСТИ ОТ СТАДИИ АРТЕРИАЛЬНОЙ ГИПЕРТЕНЗИИ

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Обследованы 131 пациент (70 мужчин и 61 женщина) в возрасте  $69,5 \pm 11,6$ , которые подверглись постоянной электрокардиостимуляции (ЭКС) по поводу атрио-вентрикулярной блокады, постоянной формы фибрилляции предсердий и синдрома слабости синусового узла с режимами стимуляции DDD/DDDR и VVI/VVIR, а также хронической сердечной недостаточностью (ХСН) с кардиоресинхронизирующей терапией (CRT-P и CRT-D). Клинические признаки пациентов оценивались в зависимости от стадии артериальной гипертензии (АГ). Результаты показали, что все пациенты с имплантированными ЭКС имели АГ II и III стадий с их соотношением 1:2,5. АГ II стадии чаще ассоциировалась со стабильной стенокардией, СД, ФП, ХСН II А и умеренной степенью АГ, АГ III стадии - с постоянной формой ФП и постинфарктным кардиосклерозом, при этом частоты встречаемости умеренной и тяжелой степеней АГ в них были одинакова. Высокая частота встречаемости у пациентов с имплантированными ЭКС АГ высоких стадий и их связь с иными нарушениями в состоянии здоровья пациентов требует оптимизации медикаментозного контроля АД.

**КЛЮЧЕВЫЕ СЛОВА:** постоянная электрокардиостимуляция, артериальная гипертензия

## INTRODUCTION

Implantation of a permanent pacemaker is effective method of treatment of resistant to medical therapy life-threatening cardiac arrhythmias and bradysystolic arrhythmia, however, it does not eliminate the problem of patient's medical support [1-3]. Arterial hypertension (AH) is one of the most important clinical syndromes requiring patient's therapeutic support. There are publications related to changes in the dynamics of blood pressure (BP) in patients with pacemaker [4-5], and treatment of individual cases. However, we did not find works in which were studied clinical features of patients with pacemakers depending on the stage of AH.

## OBJECTIVE

The aim of this work is to analyze the clinical features of patients with implanted pacemakers depending on the stage of AH.

## MATERIALS AND METHODS

131 patients (70 men and 61 women) aged  $69,5 \pm 11,6$  years who underwent permanent pacing were examined in the department of ultrasound and clinical-instrumental diagnosis and minimally invasive interventions SI «V.T. Zaytsev Institute of General and Emergency Surgery NAMS of Ukraine». The II stage of AH was diagnosed in 92 patients, 39 – had the III stage of AH. The indications for pacemaker implantation were atrio-ventricular block (AV) – 87 people (62 %), permanent atrial fibrillation (AF) – 19 people (14 %) and sick sinus node syndrome (SSS) -34 people (24 %) with pacing modes DDD/DDDR and

VVI/VVIR and dilated cardiomyopathy (DCM) – 2 people (2 %) with cardiac resynchronization therapy (CRT-P and CRT-D). In the early postimplantation period (3-5 days) medical therapy was carried out by using of angiotensin converting enzyme inhibitors, beta-blockers, calcium channel blockers, antiplatelet agents, anticoagulants of direct action. Sex (male, female), age, forms of ischemic heart disease (IHD) – postinfarction cardiosclerosis and stable angina (FC I, II, III and IV), diabetes mellitus (DM) – types I and II, AF – permanent, persistent or paroxysmal, initially identified and long-term persistent and CHF stages – I, II A, II B and III, degree of AH (1, 2 and 3) - depending on the stage of AH, were estimated. The recommendations of the Association of Cardiologists of Ukraine (2008) were used to determine the degree and stage of AH [6].

Evaluation was made of the incidence of clinical features in patients with pacemaker and AH in the early postimplantation period. The results obtained are processed after forming the database. Statistical evaluation was performed using Microsoft Excel (for parametric data: M - mean value, sd - standard deviation; for nonparametric data: absolute (n, the number) and relative (p, %) of the unit). The probability of differences between groups was determined using a parametric T -Stuydenta test. The expected result was determined by level of reliability  $p < 0,05$  and  $p < 0,01$

## RESULTS AND DISCUSSION

The table shows the distribution of patients with permanent pacing into groups in accordance with the stage of AH.

Table

**Clinical features of patients with permanent pacemakers depending on the stage of arterial hypertension**

Clinical features			AH stage	
			II	III
The proportion of patients in the sample (% ± sP)			70 ± 4	30 ± 4
Age (M ± sd)			69,1 ± 9,9	69,5 ± 9,9
Sex (n, % ± sP)	Male		54 ± 4	51 ± 4
	Female		36 ± 4	49 ± 4
IHD (n, % ± sP)	Postinfarction cardiosclerosis		0 ± 0	67 ± 4
	Stable angina	total	54 ± 4	51 ± 4
		FC I	13 ± 3	3 ± 1
		FC II	30 ± 4	38 ± 3
		FC III	10 ± 3	10 ± 3
	FC IV	1 ± 1	0 ± 0	
DM (n, % ± sP)	type	II	12 ± 3	21 ± 4
Total			34 ± 4	26 ± 4
AF (n, % ± sP)	paroxysmal and persistent		20 ± 3	10 ± 3
	permanent		14 ± 3	16 ± 3
CHF stage (n, % ± sP)	total		100 ± 0	100 ± 0
	I		27 ± 4	3 ± 1
	II A		60 ± 4	56 ± 4
	II B		13 ± 3	36 ± 4
	III		0 ± 0	5 ± 2
AH degree (n, % ± sP)	1 (mild)		13 ± 3	2 ± 1
	2 (moderate)		59 ± 4	49 ± 4
	3 (severe)		28 ± 4	49 ± 4

All patients had AH the II and III stages, dominated by the III stage of AH. The II stage of AH is more common than the III stage, less often in men than in women. The average age of patients in both groups was not significantly different.

Postinfarction cardiosclerosis predominated among the patients of the III stage of AH. Stable angina was observed in half of the patients in both groups. The frequency of occurrence IHD increased, with the growth of stable angina from the I FC to the III FC, and decreased from the III to the IV FC, while in the III FC it was the same.

DM type II occurs almost in 2 times more often in patients with AH stage III, than in patients with AH stage II. Patients with DM type I groups were absent in both.

AF with AH stage II occurred in 1,5 times more often than in the III stage. Paroxysmal and persistent forms were more often in AH

stage II, and permanent was in AH stage III. First and long persistent AF was not observed.

CHF was found in all patients, wherein the II A stage was observed more often in both groups. The I stage of CHF was more often in the stage II of AH. The II A stage of CHF occurred in 3 times more often at the III stage of AH, than at the II stage. The III stage of CHF observed in 5 times more often at the III stage of AH, than at the II stage.

The majority of patients had moderate degree of AH, in both groups. Severe degree of AH occurred in 2 times more often than mild degree. At the III stage of AH, the frequency of occurrence moderate and severe stages were the same, mild degree took place only in one case.

Our data confirm the high incidence and stages of AH in patients with permanent pacemakers, [5, 7] because of this its control have a special importance. Our data about the

frequency of myocardial infarction, AH and DM in patients with implanted pacemaker indirectly corresponds [8]. Other results are new.

## CONCLUSIONS

1. All patients with implanted pacemaker had the II and the III stages of AH with their ratio 1:2.5.

2. Stable angina, diabetes mellitus, AF, heart failure II A and moderate degree of AH were associated with the II stage of AH. The III stage of AH was associated with persistent

AF and postinfarction cardiosclerosis, while the frequency of occurrence moderate and severe AH were the same.

3. The high frequency of AH in patients with implanted pacemakers and their relationship with other disorders in the health of patients, requires optimization of blood pressure control.

## PROSPECTS FOR FUTURE STUDIES

It seems appropriate to study the optimization of treatment AH in patients with permanent pacemakers.

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