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Features of Arrhythmia in Patients with Arterial Hypertension who have Had Covid-19

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Annotation: Arterial hypertension (AH) remains the most serious medical and social problem, despite the efforts of doctors. After all, 30-35% of the population faces hypertension, and its prevalence is growing in all age groups. Hypertension is a risk factor for myocardial infarction and stroke, and its mortality remains high. The tricky thing about hypertension is that many people are unaware that they have a problem.

There is no pain in the heart, no headache, which means there is no confidence that everything is in order. Asymptomatic hypertension leads to damage to target organs such as the brain, kidneys, peripheral vessels and retinal vessels. These include myocardial infarction and chronic renal failure.

A review of published medical materials showed that the most common complication complicating the acute course of COVID-19 is arterial hypertension, especially in elderly patients[3].

According to various studies, the prevalence of hypertension in patients infected with COVID-19 ranges from 9 to 35% [1,2,4]; Hypertension is significantly more often observed in the group of patients treated in a hospital compared to patients treated in an outpatient setting. [5]. Data published to date show that patients with a history of hypertension are more likely to die from COVID-19 compared with unaffected patients [6].

Many authors report needs to correct blood pressure, especially in patients from risk group A, while optimal blood pressure values significantly alleviate the severity of symptoms of a new coronavirus infection and reduce the risk of long-term adverse outcomes of the disease [7]. In general, a review of publications devoted to the management of patients with COVID-19 revealed only a limited number of articles devoted to hypertension and the course after COVID-19 infection [8].

The purpose of this research is to study ECG changes in elderly patients suffering from hypertension and Covid-19.

Materials and research methods

The research included 115 elderly patients with hypertension (aged 60 to 74 years); all 115 patients were examined and divided into two groups. The first group included 60 patients who were recently infected with coronavirus of different severity during the period from 2020 to 2021 and underwent outpatient or inpatient treatment for the disease. The second group included 55 patients with hypertension who did not develop Covid-19. Inclusion criteria were: 1) a history of coronavirus infection (confirmed by laboratory tests), 2) the presence of hypertension of different degrees and stages for at least 5 years from the date of diagnosis, 3) signing of voluntary informed consent.

Exclusion criteria were refusal to participate in the study and patient age under 59 years.

During the research, medical documentation was studied, patients were interviewed, and laboratory instrumental data were analyzed and compared. The following information was entered into personal registration cards: gender, age, height, body mass index (BMI), smoking history, clinical symptoms (shortness of breath, general weakness, dizziness, headache, blood pressure instability) that persisted for 25-30 days after Covid-19.

Heart rate (HR), respiratory rate and blood pressure measured three times. An ECG was taken and, if necessary, an ECGCM was performed.

The main diseases for which patients were registered at the dispensary were recorded, including diabetes mellitus (DM), coronary heart disease (CHD), chronic obstructive pulmonary disease (COPD) and chronic heart failure (CHF).

Mathematical processing of all results obtained during the study was carried out using the method in the form of mean and error of variation statistics. Complex mean data (M±m). To assess the reliability of quantitative indicators with continuous values, Student's t-test was used. To assess the reliability of quantitative indicators, nonparametric Mann-Whitney tests were used. The material was processed using the statistical program “Biostat” and Microsoft Excell.

Research results

Analysis of ECG changes shows that atrial fibrillation (AF) was prevalent in 20% (n=12) of patients with Covid-19. At the same time, PVCs were recorded in 18.3% (n=11) of cases. In patients who did not survive Covid-19, these figures were 11% (n=6) and 14.5% (n=8).

As can be seen, in patients who survived Covid-19, these studied indicators were significantly increased by 50% ($p<0.01$) and 37.5% ($p<0.01$) compared to patients without Covid-19. PBBB was 50% ($p<0.01$) higher in patients without Covid-19 than with Covid-19.

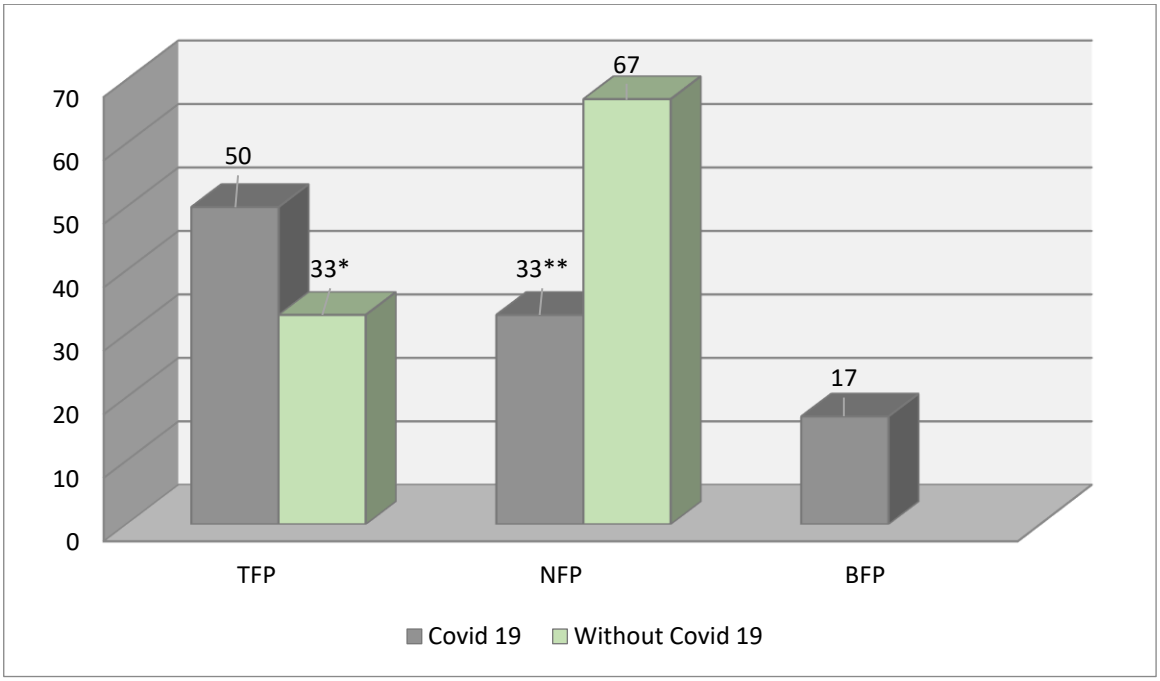
Of course, during the ECG study, other types of changes were noted, for example, LPNPG, which in our patients who had Covid-19 was 40% ($p<0.01$) higher than in patients without Covid. The same condition was repeated with AV block (with a 20% advantage ($p<0.05$) in the study group) (Table 1).

Table №1. Frequency of occurrence of arrhythmia in the analyzed groups

№	Indicators studied	Patients with Covid -19 n=60		Patients without Covid -19 N=55	
		n	%	n	%
1	AF	12	20**	3	5,4
2	VE	11	18,3**	8	14,5
3	AV block	5	8,3*	1	2,0
6	LBBB	5	8,3**	2	4,0
7	PBBB	4	7,0	8	14,5***

Note:*$p<0.05$**$p<0.01$,***$p<0.001$ between groups, AF-atrial fibrillation, PVC-ventricular extrasystole, LBBB-complete left bundle branch block, PBBB-complete right bundle branch block.

Because the above data show that AF is common, we focused on the clinical types of this type of arrhythmia in our study.

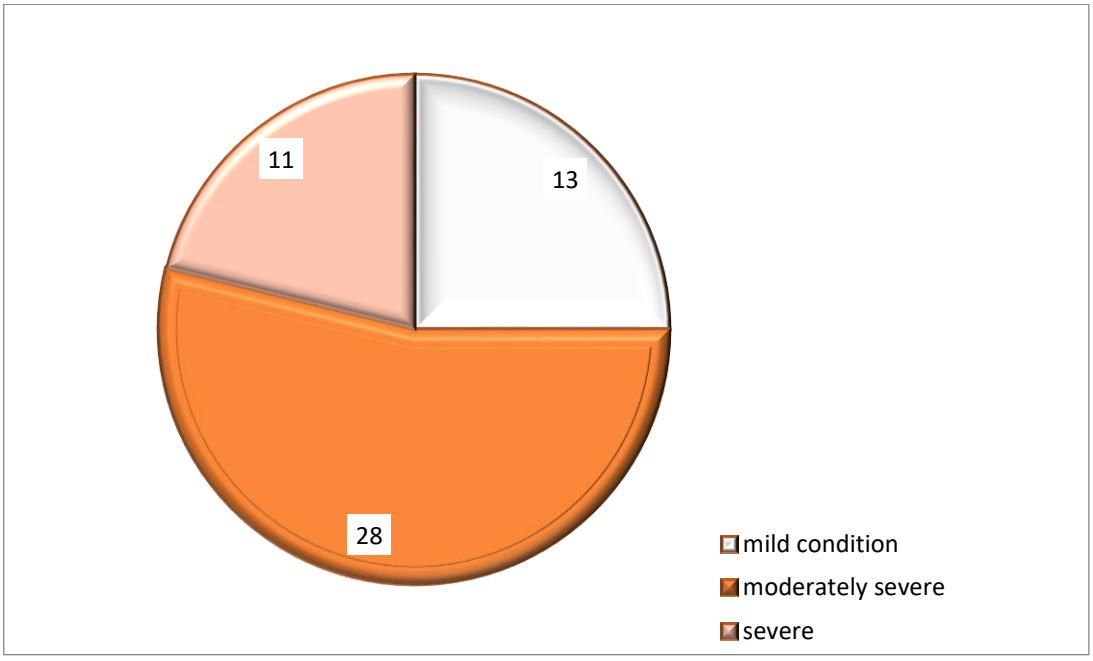


Note; *p<0.01,**p<0.01 significance of differences between groups, TFP-tachysystolic form of AF, NFP-normasystolic form of AF, BFP-bradysystolic form of AF

Pic.1. Clinical variants of AF (%)

According to the analysis, among patients infected with Covid-19, TFP was detected in 6 (50%) patients, NFP in 4 (33.3%) patients, BFP in 2 (17%) patients, while in the group of patients without Covid these the rates were 1 (33%) and 2 (67%). There was variation in the occurrence of clinical types of AF within the group. In patients infected with Covid-19, NFP is 50% (p<0.01), TFP is 17% (p<0.05), significantly higher compared to the group not infected with Covid. The BFP variant of arrhythmia cannot be traced in patients uninfected with Covid.

We analyzed the incidence of AF depending on the severity of Covid-19. In our examined patients, a mild clinical condition of Covid was recorded in 13 patients, moderately severe in 28 and severe in 11 patients (according to anamnestic data) (Pic. 2).

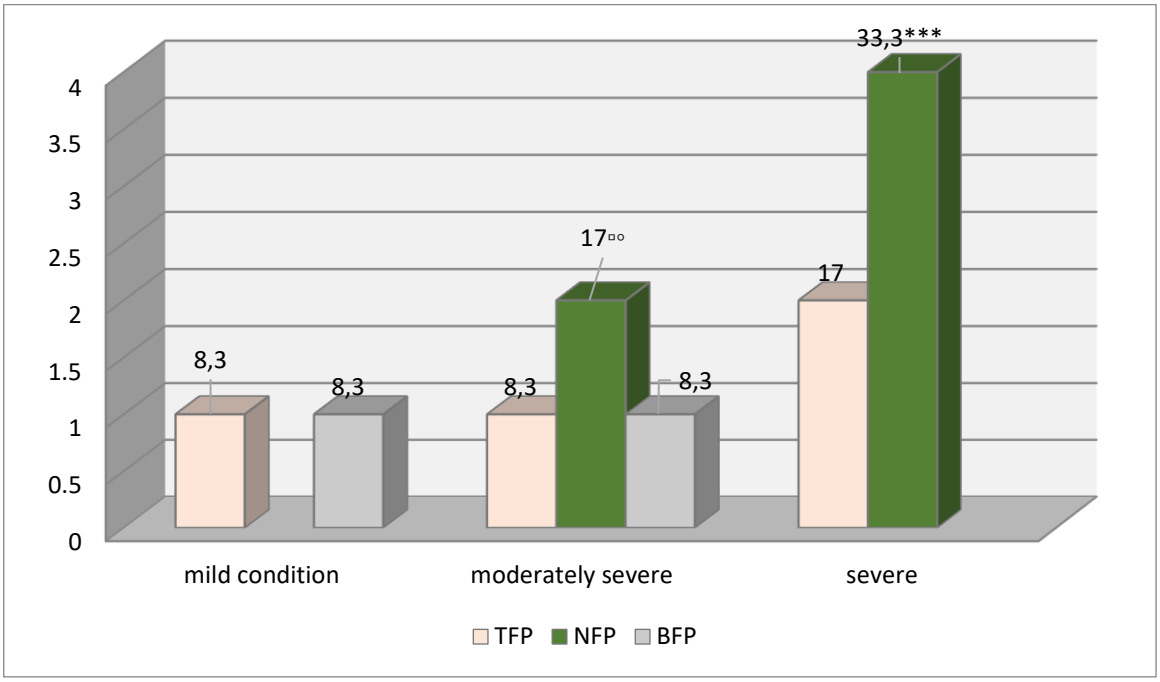


Pic.2 Clinical variants of Covid-19 (n)

The data presented in Fig. 2 shows that the moderate severe form of Covid-19 is most common in patients included in the survey, while the severe form is the least common.

In the case of a mild form of the virus, the registered type of AF was equal in frequency of occurrence of NAF and BFP; both types were recorded in one patient in both groups (8.3% and 8.3%). But with a moderately severe type of the virus, a significant difference in the incidence of TFP was observed, that is, this clinical variant of AF was registered in 2 patients (17%), a significant difference is not visible in the registration of TFP and NFP (Pic. 3).

The severe type of the virus differed in the clinical types of AF, with the clinical type of TFP being common in 33.3% (n=4), and NFP in 17% (n=2) of cases (Pic. 3).



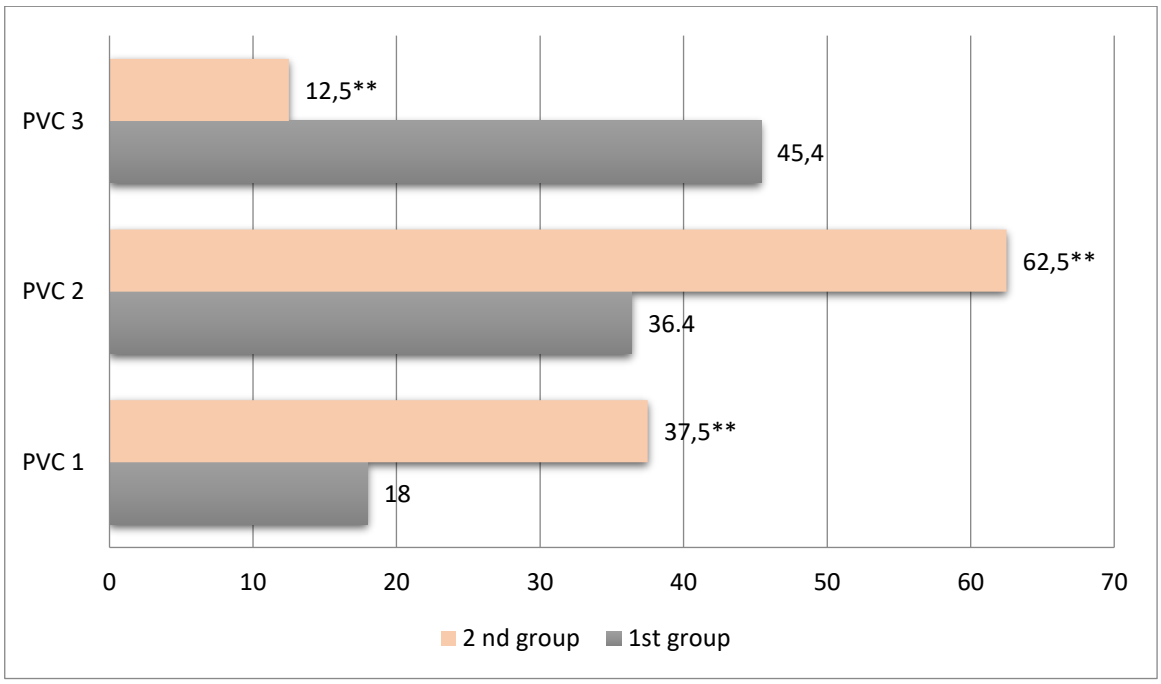
Note; ***p<0.01 reliability of TPP to NFP in T variant, °°p<0.0001 TPP to NFP and BFP in ST, LT-mild course, ST-moderate severe course, T-severe course

Pic. 3 Frequency of occurrence of clinical variants of AF depending on the course of Covid-19 (%)

As already presented in Table No. 1, a total of 19 cases of PVCs were registered, of which 11 (21%) were in group 1, and 8 (17%) in group 2 of patients. We also analyzed the distribution of clinical variants of PVCs (Gradation of PVCs according to Lown-Wolf-Ryan) in the analyzed groups and revealed the following picture; in group 1, grade 1 of PVCs was detected in 2 (18%), grade 2 in 4 (36.4%) and grade 3 in 5 (45.4%), in group 2 37.5% (n=3) , 62.5% (n=5) and 12.5% (n=1) (Pic. 4).

Next, we analyzed the occurrence of clinical variants of PVC depending on the severity of the virus.

In group 2 patients, grade 2 PVCs were 25% higher (p<0.01), grade PVCs 1 were 50% higher (p<0.01) compared to group 1. Along with this, grade 3 PVCs in patients with Covid-19 had a 20% high value compared to groups of 2 patients (Pic 4).



Note;** p<0.001 ***p<0.001 significance of differences between groups

Pic.4. Frequency of occurrence of types of PVCs in the analyzed groups (%)

Thus, heart rhythm disturbances accompany patients with viral infections causing viral myocarditis. The analysis suggests that rhythm disturbances also occur in patients infected with Covid-19, even after discharge from the infectious diseases hospital, that is, in the post-Covid period.

In our research, the most common types of arrhythmias in patients with hypertension and Covid-19 were AF and ventricular extrasystoles.

Further studies are needed to establish the pathogenesis of arrhythmias in patients with COVID-19 and determine their long-term prognosis. In modern literature, there are no detailed studies of arrhythmias and their pathogenesis, which makes it difficult to differentiate arrhythmias caused by hypoxemia, metabolic disorders, inflammatory syndromes and concomitant diseases.

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