THE STATE OF THE SYMPATHETIC-ADRENAL SYSTEM IN THE DEVELOPMENT OF CARDIOVASCULAR DISEASES IN AN ORGANIZED POPULATION

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Abstract

The health of the population is the most valuable benefit for the state, its economic and cultural development. It influences the level of mortality, total life expectancy, fertility, disability and, ultimately, determines the population [1].

Keywords: non-communicable pathologies, cardiovascular diseases, measuring blood.
Among non-communicable pathologies, cardiovascular diseases (CVD) lead to the majority of deaths – 17.5 million people die from them annually [2].

Introduction

Recent studies have demonstrated the importance of measuring blood pressure (BP) outside the doctor's office in order to accurately assess the severity of arterial hypertension (AH) and identify a higher risk in some patients with normal blood pressure. Modern research allows us to consider stress as an independent risk factor for CVD from the standpoint of evidence-based medicine. There is convincing evidence about the impact of work-related stress on the risk of hypertension. Representatives of the operator profession tested a model of operating voltage that leads to a negative effect on the cardiovascular system (CVS) [3]. Employees of UzAvtoMotors (truckers) are a sample of the operator profession, which combines significant psycho-emotional stress and frequent acute stressful situations, which contributes to the occurrence of hypertension [4]. The results of such studies for healthcare in different countries necessitate the development of screening systems and control of the epidemic situation [12].

One of the priority tasks of the sectoral healthcare is to ensure the professional health of the employees of the UzAvtoMotors garage, based on the principles of primary prevention of non-communicable diseases, taking into account the occupational risk.

There is an obvious need for early diagnosis and prevention of stress-induced conditions in these individuals. However, the question of the contribution of factors to the formation of hypertension has not been fully studied, the role of stress reactivity in the recognition of this disease has not been clarified, the features of HVS remodeling have not been studied, there is no clear idea of the prognostic role of this form of arterial hypertension. Solving these issues could improve the early diagnosis of hypertension, as well as formulate a strategy for its prevention and treatment.

The Purpose of the Study

to assess the impact of occupational stress on risk factors and total coronary risk in drivers of UzAvtoMotors. To identify the features of the course of arterial hypertension in the workplace among employees of the UzAvtoMotors garage.

For the SAS study, we examined 77 employees of Uz-avto motors, who were divided into the following 4 groups: group I (control) - healthy people working in the office (12 employees) aged 20-40 years; group II (experienced) - truckers without GB (20 employees), group III (experienced) – people working in the office with HBP (20 employees), group IV (experienced) – truckers with HBP (25 employees).

The diagnosis in all patients was made on the basis of subjective and objective examination, laboratory analysis and functional diagnostics.

To assess the sympathetic-adrenal system, enzyme immunoassay was used using the Mindray MR-96A apparatus, morning blood and daily urine blood were taken for the study. The results of clinical trials were processed using the applied statistical processing programs of the Excel program, as well as by the method of variation statistics according to Fischer using the Student's t-criteria tables [2]. The arithmetic mean values (M) and the average errors of the arithmetic mean (m) are indicated. The differences between the arithmetic mean values were considered statistically significant at $p < 0.05$

Results and Discussion

When analyzing the results, we noted a statistically significant increase in the excretion of A and NA in the blood and in the daily urine of group II individuals. Thus, the daily excretion of A in the urine of group II compared with healthy individuals increased by 5.7 times ($P < 0.001$), and in the blood by 2.3 times ($P < 0.01$). There was also an increased content of A 2.6 times in urine and 1.6 times in blood serum in patients III compared with the control. The difference in excretion of A in the fourth group was 8 times in daily urine, 2.8 times in blood ($P < 0.05$).

When examining the results of NA, we noted a statistically significant increased content in blood and urine in groups II, III, IV compared with I. Thus, the daily excretion of NA in the urine in patients of group II compared with healthy individuals increased by 4 times ($P < 0.001$), in the blood NA increased by 1.8 times ($P < 0.05$). There was also an increased content of NA 2 times in urine and 1.2 times in blood serum in patients of group III compared with the control. The difference in the excretion of NA in the fourth group was 7 times in the daily urine, 2.3 times in the blood compared to the first ($P < 0.05$).

Examining DA in daily urine and in blood serum, we noted a significant increased content of this indicator in groups II, III, IV compared with I. The daily excretion of DA in the urine in group II

compared with healthy increased by 6.7 times (P < 0.001), in the blood DA increased by 5 times (P<0.05). There was also an increased level of DA in urine (1.1 times) and in blood serum (2.5 times) in patients of group III compared with the control group. The difference in the excretion of DA in the fourth group was 11.7 times in the daily urine, 8.1 times in the blood compared to the first (P<0.01).

In order to identify the relationship between the level of catecholamines and the development of cardiovascular complications, we also conducted a Spearman correlation analysis. A direct, highly reliable correlation was revealed between KA in blood serum, in urine and HBP levels.

Thus, the values obtained by us indicate a statistically significant increase in the excretion of KA, in particular A, NA and DA in the daily urine and blood serum in group 4 (truckers with GB).
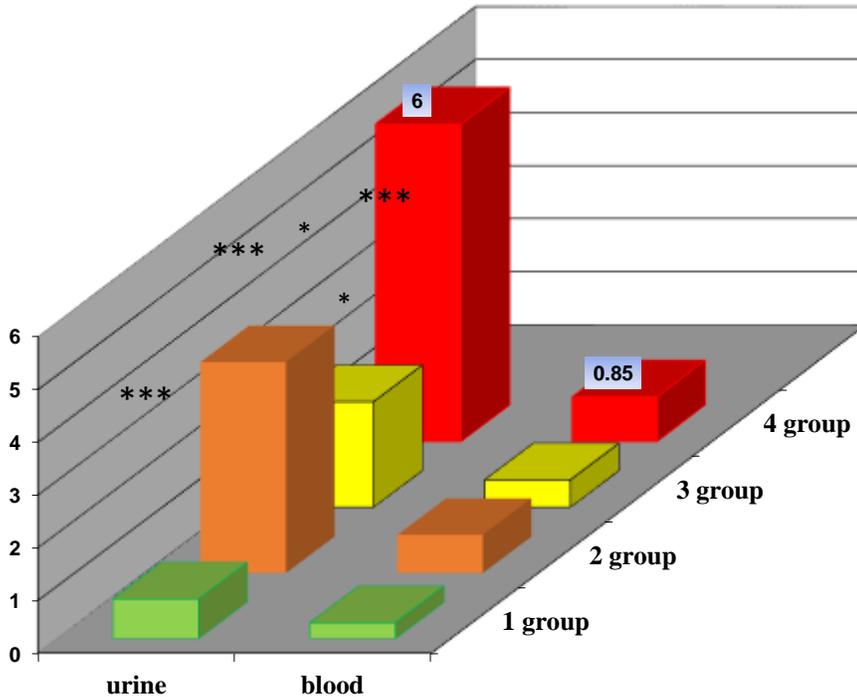

Diagram 1. The content of adrenaline in the blood and urine of the employees of "UZ-AVTO MOTORS" (* - P<0,05; ** - P<0,01; *** - P<0,001).
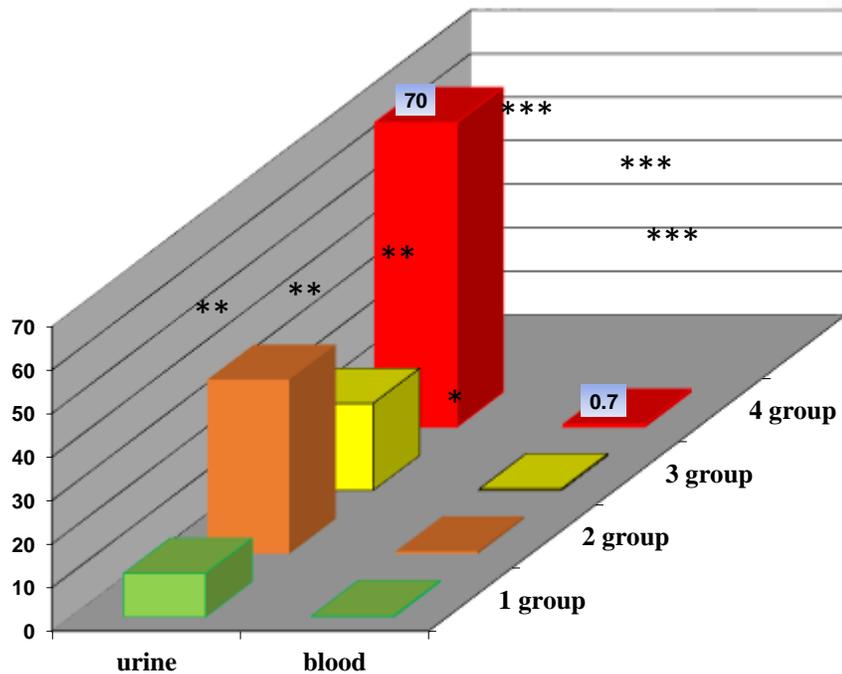
Diagram 2. Norepinephrine content in blood and urine of UZ-AVTO MOTORS employees (* - P<0,05; ** - P<0,01; *** - P<0,001).

Table 1. The content of adrenaline, norepinephrine and dopamine in the blood and urine of UZ-AVTO MOTORS employees

№	Groups	Catecholamine					
		A urine (mkg/day)	A blood (mkg/day)	NA urine (mkg/day)	NA blood (mkg/day)	DA urine (mkg/day)	DA blood (mkg/day)
1	I Group	0,75±0,12	0,3±0,03	9,8±1,2	0,3±0,01	60,2±3,2	0,8±0,01
2	II Group	4,2±0,2	0,7±0,19	40,1±2,3	0,55±0,02	400,4±25,3	4,05±0,82
3	III Group	2,0±0,31	0,5±0,04	20,6±2,4	0,37±0,01	65,3±3,4	2,3±0,08
4	IV Group	6,1±0,7	0,85±0,09	70,3±3,3	0,7±0,02	700,3±5,9	6,5±0,12
	P_{1-2}	P<0,001	P<0,05	P<0,001	P<0,05	P<0,001	P<0,05
	P_{1-3}	P<0,001	P<0,001	P>0,05	P<0,001	P<0,001	P<0,001
	P_{1-4}	P<0,001	P<0,001	P>0,01	P<0,001	P<0,001	P<0,001
	P_{2-3}	P<0,001	P<0,001	P<0,05	P<0,05	P<0,001	P<0,001
	P_{2-4}	P<0,001	P<0,001	P<0,01	P<0,01	P<0,001	P<0,001

Discussion: From a practical point of view, it is absolutely clear that for patients with hypertension it is necessary not only to determine the degree of risk, but also to decide which of the parameters should

be adjusted, in addition to lowering blood pressure, in order to achieve the main goal - to minimize the risk of morbidity and mortality from cardiovascular diseases by influencing all modifiable risk factors, including including stress [6, 10]. The choice of priorities is important both for the patient and for the healthcare system as a whole. Uz-Avto Motors employees who do not have cardiovascular diseases, under the influence of working psycho-emotional stress, the frequency of modifiable risk factors for the development of CVD increases. In patients with arterial hypertension in the workplace, the absolute risk of ischemic events increases with increased stress.

Conclusion

Thus, the conducted studies allow us to speak with confidence about the pathological role of occupational stress as a risk factor for hypertension and cardiovascular complications. To date, the operating voltage models that are of the greatest importance in the occurrence of CVD have been identified, among them drivers have a special position. There is an obvious need for early diagnosis and prevention of stress-induced conditions in these individuals.

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