Improving the Quality of Life of Patients with Arterial Hypertension in Diabetes Mellitus

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Abstract: Currently, there are no recommendations on the features of detecting early signs of CHF in patients with diabetes mellitus. And they are necessary, taking into account that in case of diabetes mellitus type 2 (more than 95% of all patients with diabetes mellitus), the overwhelming number of patients are overweight and obesity, which can affect the validity of the 6-minute walk test and scale clinical state assessment (SHOX) in the modification.

In the treatment of patients with CHF, the "gold" standard is the use of angiotensin-converting enzyme inhibitors (ACE inhibitors) according to the third edition of the recommendations on the diagnosis and treatment of CHF. Antagonists of receptors for angiotensin II type 1 (APA II) remain at the same time reserve drugs. Adherence to these standards of patients in different regions of the Russian Federation varies over a rather wide range, and there is almost no information about the compliance of patients with diabetes mellitus with prescribed drug therapy in the presence of CHF.

Thus, the need to identify the frequency of CHF in patients with type 2 diabetes, clarifying the features of this diagnosis and optimizing the treatment of such patients is beyond doubt.

Objective: to clarify the frequency of chronic heart failure in patients with type 2 diabetes in the specialized department of the hospital and unorganized urban population, to assess the adequacy of its diagnosis and treatment.

Research Objectives: Identify the prevalence of chronic heart failure in patients with type 2 diabetes.

To assess the level of diagnosis of chronic heart failure in patients with type 2 diabetes.

To analyze the state of drug therapy for patients with type 2 diabetes in the presence of chronic serum

Keywords: Diabetes mellitus type 2 arterial hypertension self-control blood glucose blood pressure control.

INTRODUCTION

Numerous studies have shown that diabetes mellitus and arterial hypertension are similarly associated with an increase in cardiovascular mortality. The presence of both diseases increases the risk of death by 2 times. Moreover, in 90% of cases, diabetes mellitus is accompanied by arterial hypertension [1, 2]. The basis of the close relationship of these diseases is the unity of the pathogenetic links, in particular, insulin resistance and hypersympathicotonia.

Hypertension is high blood pressure, which increases the risk of heart attack, stroke and kidney failure. This disease is especially dangerous in combination with diabetes mellitus: this condition greatly increases the risk of heart attack, stroke, kidney failure and other complications. The main causes of hypertension are hereditary predisposition, overstrain, overweight, stress, inactive lifestyle, excessive salt intake, diseases of the kidneys, heart, adrenal glands or spine. The trigger for hypertension can be a strong emotional strain. Uncontrolled hypertension can also lead to blindness, arrhythmias and heart failure. The risk of developing these complications increases with other cardiovascular risk factors, such as diabetes. Every third adult in the world develops hypertension. The proportion of people with hypertension increases with age from one person out of ten at the age of 20 to 40 years old to five out of ten at the age of 50 to 60 years old.

The development of hypertension is different and depends on the type of disease. Thus, in the insulin-dependent form of the disease, arterial hypertension in most cases develops due to diabetic kidney disease. In a small number of patients, primary arterial hypertension is observed, or isolated systolic hypertension.

If the patient has insulin-independent diabetes, then hypertension is formed in some cases much earlier than other metabolic diseases.

Many, except for a headache, do not have any symptoms, it is possible to establish the disease by measuring blood pressure.

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Blood pressure is subject to daily rhythm. At night it goes down. In the morning it is lower by 10-20 percent than during the day. In diabetes, this daily rhythm is disturbed, and it turns out to be high all day. Moreover, at night it is even higher than during the day.

This disorder is associated with the development of one of the dangerous complications of diabetes mellitus - diabetic neuropathy. A condition in which high sugar adversely affects the functioning of the autonomic nervous system. In this case, the vessels lose the opportunity to taper and expand, depending on the load.

It is possible to determine the type of hypertension by daily monitoring.

DISCUSSIONS

It is known that insulin resistance even before the development of clinical manifestations of diabetes and hypertension leads to damage to the vascular wall. According to the Atherosclerosis Risc in Communities (ARIC) study, the rigidity of the vascular wall was a predictor of arterial hypertension: with a decrease in the elasticity of the vascular wall by one standard deviation, the risk of arterial hypertension increased by 15% [3]. To understand the relationship between insulin resistance and damage to the vascular wall, we recall the mechanism of insulin action. Normally, insulin via the vascular wall receptor IRS-1 activates phosphatidylinositol-3 kinase, protein kinase B, which ultimately initiates endothelial NO-synthase and leads to the synthesis of NO and, accordingly, vasodilation. On the other hand, insulin stimulates the synthesis of endothelin-1 through the action on mitogen-activated protein kinase, i.e., it causes vasoconstriction.

Thus, the effect of insulin on the endothelium creates a balance between vasodilating, antithrombotic and anti-inflammatory effects and vasoconstrictor, inflammatory and thrombotic effects.

Thus, insulin resistance provokes an increase in stiffness and rigidity of the vascular wall, which leads to the development of arterial hypertension. Another trigger for the development of hypertension and diabetes mellitus is an imbalance of the autonomic nervous system, manifested hypersympathicotonia. The basis of this phenomenon, among other reasons, is hyperleptinemia and hyperinsulinemia. Let us dwell on them in more detail. It is believed that with obesity selective leptin resistance is formed. For some reasons that are not currently established, there is a violation of leptin sensitivity in the arcuate nuclei of the hypothalamus (STAT 3 receptor), as a result of which the anorectic effect of leptin is blocked. However, this retains sensitivity in the ventromedial and dorsal nuclei of the hypothalamus, and the effect of leptin on them leads to the activation of sympathetic influence [4]. Hypersympathicotonia leads to an increase in the expression of the gene responsible for the synthesis of angiotensinogen in adipose tissue, which activates the renin-angiotensin system in the kidneys. The resulting angiotensin II, in turn, is a powerful vasoconstrictor peptide and, in addition to this, through the effect on the AT1 receptors, increases the expression of SGLT2 receptors in the kidneys. Accordingly, glucose reabsorption increases, and sodium retention occurs [5]. This may explain the ability of SGLT2 receptor inhibitors to have a moderate hypotensive effect, reducing the risk of cardiovascular complications.

Insulin resistance provokes an increase in stiffness and rigidity of the vascular wall, which leads to the development of arterial hypertension

In addition, angiotensin II stimulates the production of aldosterone in the adrenal glands. At the same time, it is known that there is a direct link between an increase in the level of aldosterone and cardiovascular complications. It was also found that patients with diabetes mellitus and elevated aldosterone had a 10% higher risk of cardiovascular mortality compared with patients with normal aldosterone levels [6]. The pathogenetic mechanism of this dependence is explained by the effect of aldosterone on the vessels. [7]

In addition, aldosterone contributes to the further progression of insulin resistance, since it activates serine kinase, which causes the degradation of IRS-1. In the future, as diabetes mellitus progresses, all parts of the autonomic nervous system are affected, which was confirmed in a study conducted at our department. The study involved 86 patients with an established diagnosis of type 2 diabetes mellitus and concomitant arterial hypertension.

The characteristics of blood pressure, such as the magnitude of the morning rise and the variability of blood pressure, were also associated with the defeat of the parasympathetic nervous system. The more the parasympathetic system was suppressed, the higher were these indicators. Thus, hypersympathicotonia is a common starting point in the development of both diabetes mellitus and arterial hypertension. Formation as the disease progresses relative

hypersympathicotonia leads to further progression of carbohydrate metabolism and increased blood pressure. The widespread occurrence of arterial hypertension among patients with diabetes indicates the need for timely diagnosis. [8]

METHODS

Currently, the main method for assessing blood pressure, according to the recommendations of the Scientific Society of Cardiology and the Medical Society for Arterial Hypertension, is the clinical measurement of blood pressure. This method allows you to estimate blood pressure at a given point in time. From a clinical point of view, it is extremely important to evaluate blood pressure indicators during the day. The indicators characterizing the daily pressure can be attributed to mean arterial pressure, area index and time of hypertension, reflecting the percentage of time when blood pressure numbers exceed target values. This information can be obtained using daily blood pressure monitoring. According to the monitoring data, average daily and average nightly blood pressure values and their ratio are calculated. The importance of evaluating these indicators in patients with diabetes mellitus is shown by the results of our study, since an increase in the average level of systolic blood pressure in patients with type 2 diabetes and IHD is a predictor of myocardial ischemia and ventricular rhythm disturbances. [9]

The level of systolic blood pressure was significantly higher in the group of patients with myocardial ischemia in the daytime ($p = 0.043$) and at night ($p = 0.01$). In addition, in patients with ventricular arrhythmias, significantly higher blood pressure was recorded.

The relative risk of cardiovascular mortality in the absence of nocturnal arterial pressure decreases in normotonics by 2.78 times, and in hypertensive patients by 6.27 times

The arrhythmogenic nature of hypertension, among other things, is manifested by a lengthening of the corrected QT interval. We have identified a significant direct relationship between mean daily systolic blood pressure ($r = 0.98$, $p = 0.001$) and mean daily diastolic blood pressure ($r = 0.65$, $p = 0.04$) with a QT interval. The duration of the QT interval in patients with ventricular arrhythmias was significantly longer ($p = 0.003$). In order to assess individual cardiovascular risk, it is necessary not only to study the average blood pressure level, but also its variability, the magnitude of the night decrease and the morning rise in blood pressure. Recall that in normal humans there are circadian rhythms with a decrease in blood pressure at night, reaching a minimum between 2 and 5 hours, followed by a sharp increase in blood pressure (exceeding the night pressure by an average of 20 mm Hg. And daily pressure by 10 mmHg.). In healthy individuals, there is a normal nightly decrease in blood pressure by 10–22% (dipper group) as compared with the level of daytime blood pressure.

In a study of patients with hypertensive heart disease, patients with a non-dipper daily profile had a significantly greater decrease in creatinine clearance and an increase in urinary protein excretion after 3 years of observations compared with patients with a healthy daily profile [10]. An insufficient reduction in blood pressure increases the risk of cerebrovascular complications [11]. Currently, there are several hypotheses about the possible causes of violations of the daily profile. In some studies, an interrelation of atherosclerotic vascular lesion and disturbance of the arterial blood pressure profile was revealed. But it is not entirely clear what is the cause and what the consequence. On the one hand, nighttime hypertension exacerbates the damage to target organs in hypertension, but on the other hand, atherosclerosis leads to impaired baroreflex sensitivity in the carotid sinus area, which may cause a violation of the daily arterial pressure profile.

An inadequate nightly decrease in blood pressure increases the risk of ischemic events. In patients with ischemic episodes, the daily index (ratio of daytime and nocturnal arterial pressure) was significantly lower than in patients without myocardial ischemia.

According to the study, an adverse effect of blood pressure variability was identified, which can be assessed as a reliable predictor of stroke and heart attack, regardless of the average level of blood pressure, age.

DISCUSSION

It should be noted that at the moment there is clear evidence that a decrease in blood pressure leads to a decrease in the number of cardiovascular events [18–20]. According to the latest recommendations, the onset of antihypertensive therapy is indicated for all patients with hypertension of the 2nd and 3rd degree, regardless of cardiovascular risk, and patients with hypertension of the 1st degree in combination with diabetes, organ damage, and if the lifestyle change has

not resulted to lower pressure numbers. At the same time, the choice of target blood pressure values may differ in different categories of patients. [12]

CONCLUSION

In order to prevent hypertension in diabetes mellitus and to raise the quality of patients with this disease we come to conclusion.

1. Reduce the amount of edible salt up to the physiological needs of the body, that is, up to 5 grams per day. Sodium draws water into the bloodstream, increasing blood volume, which naturally increases pressure. In turn, a decrease in sodium intake in the body contributes to the elimination of water and pressure reduction. Exclude from the diet a variety of pickles and marinades, canned food, sauces, sausages, ham, sausages and wieners, salted and smoked fish and meat.

2. Include potassium-rich foods in your diet and magnesium. These microelements are rich in dried fruits, beans, nuts, sea kale, peas, potatoes.

3. Pay attention to the preservation of vitamins in food. It is desirable to enrich the diet with multivitamin preparations.

4. To limit the use of protein, especially contained in meat products. Daily allowance of meat - 100-120 g (raw). It is best to boil it so that the purine compounds undesirable for hypertensive patients turn into broth. Recommended: low-fat beef, veal, rabbit, turkey, chicken. When hypertension is particularly useful protein in the form of casein, contained in milk and curd. Give up salty and fatty cheeses, sour cream and cream can be consumed in limited quantities.

5. Limit fat intake. Avoid too fatty and difficult to digest food. Spicy seasonings, vinegar, alcohol are completely excluded. Any alcohol intake in one way or another causes complex neurohumoral disorders resulting in an increase in pressure.

6. Limit the amount of fluid you drink. The volume of free fluid entering the body during the day - no more than 1200 ml. This amount does not include soup and water in the composition of the prepared dishes. Vegetable and fruit juices, weak tea are preferable from drinks, and natural coffee should be completely excluded.

7. Eat more fruits and vegetables in any form, especially raw. Add in meat dishes, start a meal with a vegetable salad. Fruits should be the main food for snacks, the number of fruit units eaten per day should be at least five, preferably varied. The main "heart" fruits - apples, bananas, apricots, grapes, dates, oranges, tangerines.

8. Exclude from the sweet food.

9. Change the characteristics of culinary processing: boil meat and fish; Boil eggs boiled, but not hard-boiled and do not fry. Bread is preferred yesterday's pastries.

The combination of the diet recommended for diseases of the cardiovascular system and the diabetic table will be optimal.

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