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Approaches to Managing Cardiovascular Risk Factors in Patients with Type 2 Diabetes Mellitus

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Abstract

Diabetes mellitus is one of the most common diseases, and therefore, this problem is one of the priorities for doctors and healthcare in all countries. Type 2 diabetes mellitus is a chronic disease that leads to the risk of developing cardiovascular complications and pathologies in patients, and, as a result, to high mortality or disability. Diabetes is combined with such diseases as coronary heart disease, stroke, atherosclerosis of the vessels of the lower extremities, cardiomyopathy, and congestive heart failure. This article reviews the treatment management of diabetes, especially to reduce mortality among patients with diabetes mellitus.

Discipline: Medicine.

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1 Introduction

The problem of diabetes mellitus has high growth and prevalence everywhere from year to year, and therefore its relevance is increasing more and more [1].

Weight gain, the development of metabolic syndrome, and type 2 diabetes mellitus may occur as a response to:

- lack of movement (hypokinesia);
- improper nutrition: high content of fats, salts, carbohydrates, and various additives in food;
- bad habits;
- stress factors;
- acceleration of the pace of life;
- genetics;
- ecology.

Thus, at this stage, diabetes mellitus, as a non-communicable disease, is on par with oncology and cardiovascular pathology, leading to disability or death.

2 The Current State of the Issue of Diabetes Mellitus

Diabetes mellitus refers to chronic diseases and has a progressive type, is characterized by an increased level of glucose in the blood serum (hyperglycemia), and has concomitant conditions (deterioration of vision, poor wound healing, kidney failure, cardiovascular diseases, etc.) [2].

Of particular concern is the fact that in 50% of cases the disease is not diagnosed [3,4]. Often, the disease can be detected only a few years after its occurrence, which leads to the presence of complications.

Researchers have found that a large number of patients with diabetes have type 2 diabetes mellitus. Type 2 diabetes mellitus is adult diabetes or insulin-dependent. The causes of its occurrence are an unhealthy lifestyle and insufficient physical activity. Until recently, such diabetes was detected only in adults, but the disease has received a "rejuvenation" and can now be detected in children [5].

The development of diabetes occurs in cases of insufficient production and effective use of insulin. With this disease, the level of sugar in the blood increases, and as a result, this leads to malfunctions in the body's system. It has a special effect on the nervous and cardiovascular systems [6-8].

The spread of diabetes mellitus depends on the level of income of the population: the lower it is, the faster the disease develops. In low–income countries, a particular prevalence of diabetes is observed in people over 60 years old, and in high-income countries - in patients after 70-75 years.

3 Cardiovascular Risk Factors in Patients with Type 2 Diabetes Mellitus and Approaches to Their Management

One of the main causes of death in patients with diabetes mellitus is cardiovascular pathology, and diabetes mellitus itself is a cardiovascular risk factor. In addition, diabetes is

combined with such diseases as coronary heart disease, stroke, atherosclerosis of the vessels of the lower extremities, cardiomyopathy, and congestive heart failure [9-11].

With type 2 diabetes, metabolic disorders appear that form risk factors for the cardiovascular system (obesity, dyslipidemia, hyperinsulinemia, insulin resistance, etc.).

The relationship between elevated blood sugar (hyperglycemia) and cardiovascular diseases is very high. With chronic hyperglycemia, atherosclerosis often develops (free radicals are intensively formed, which can bind to lipid molecules) [12,13]. An increase in the level of glycemia increases the risk of developing cardiovascular pathology.

The indicator reflecting the average daily plasma glucose level is glycated hemoglobin (HbA1c). The HbA1c level has a standard and determines the glycemic status in patients with diabetes mellitus.

Scientists have also revealed that complications of diabetes mellitus can occur from the variability of glycemia. With its strong increase, powerful oxidative stress is observed. Patients with type 2 diabetes mellitus are more likely to develop ventricular arrhythmias if there is a high amplitude of daily fluctuations in glycemia [14].

Also, fluctuations in glycemia can lead to disruption of vascular processes (for example, cause inflammation or oxidative stress). Such fluctuations most often occur in patients with type 2 diabetes mellitus and depend on meals.

That is why strict glycemic control is recommended, which will minimize the risk of complications, as well as reduce the mortality rate [15]. But at the same time, there may be negative results: weight gain, hypoglycemia, etc. Thus, the choice of medications and the selection of therapy are carried out individually, taking into account the characteristics of each patient's body.

Insulin resistance (IR) is one of the causes of the occurrence and rapid development of cardiovascular diseases. At the same time, the frequency of multiple atherosclerotic lesions of coronary vessels increases. Insulin resistance adversely affects the structure and function of the myocardium in patients of different risk categories.

Another factor influencing cardiovascular diseases is obesity [16-19]. Adipokines such as leptin, adiponectin, resistin, omentin, visfatin, etc. are produced in adipose tissue. Leptin, namely its level positively interacts with the content of triglycerides and free fatty acids in patients with type 2 diabetes mellitus and obesity, which indicates the relationship of leptin with lipotoxicity [20].

To reduce overall mortality, it is necessary to reduce body weight, and at the same time, this will have a positive effect on glycemic control in patients with type 2 diabetes [21-23].

Hyperuricemia - an increased content of uric acid also serves as a risk factor for the development of cardiovascular diseases. Elevated uric acid levels can lead to arterial hypertension, congestive heart failure, and impaired kidney function [24,25].

For patients with cardiovascular risk, the elevated uric acid content is especially dangerous and can be a prognostic parameter of cardiovascular and general mortality.

Thus, disorders of uric acid metabolism in patients with diabetes mellitus should be carefully monitored and corrected in time.

To reduce mortality among patients with diabetes mellitus, it is necessary to control and manage cardiovascular risk factors [26, 27]. This is possible thanks to the use of individually selected drugs that have favorable properties for the cardiovascular system.

A hypoglycemic drug selected by a specialist should perform several functions at once: firstly, to control glycemia, and secondly, to minimize the risk of developing cardiovascular diseases.

Particular attention is paid to the effect of hypoglycemic drugs on reducing the volume of visceral fat. Such fat causes complications in type 2 diabetes mellitus, and the use of drugs reduces its volume [28,29].

Also, for many patients, hypoglycemic therapy is recommended, which will be of a combined nature [30].

4 Conclusion

Type 2 diabetes mellitus is a very common disease that is of particular importance for all countries. Cardiovascular risks pose a particular threat to the life of patients with type 2 diabetes mellitus (according to statistics, the mortality rate is above 50%). That is why such a strategy of treatment of patients with type 2 diabetes mellitus is recommended, in which there will be a one-time impact on cardiovascular risk factors.

Researchers recommend developing an individual treatment line in which the assessment of hypoglycemic drugs would be considered not only because of their effect on the compensation of carbohydrate metabolism but also took into account the cardiovascular risks of patients and the possibility of their further correction. At the same time, it is necessary to pay attention to cardiovascular diseases that have already been detected in the patient. Thus, when choosing a drug, it is necessary to conduct studies and analyzes in order to exclude a negative impact on the course of the disease.

5 Availability of Data and Material

Data can be made available by contacting the corresponding author.

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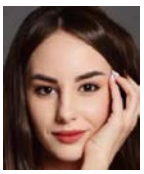

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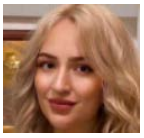

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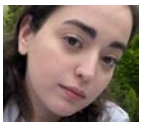

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