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Pharmacotherapy of Hyperglycemia

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Abstract: The unsufficient pharmacological correction of the basic components metabolic syndrome is shown. Is analyzed mortality of the population in conditions of inadequate correction components of metabolic syndrome.

Keywords: hyperlipidemia, abdominal obesity, arterial hepertension, treatment, hyperglycemia.

Introduction

Diabetes mellitus is a major public health problem, affecting about 10% of the population. Pharmacotherapy aims to protect against microvascular complications, including blindness, end-stage kidney disease, and amputations. Landmark clinical trials have demonstrated that intensive glycemic control slows progression of microvascular complications (retinopathy, nephropathy, and neuropathy). Long-term follow-up has demonstrated that intensive glycemic control also decreases risk of macrovascular disease, albeit rigorous evidence of macrovascular benefit did not emerge for over a decade. The US FDA's recent requirement for dedicated cardiovascular outcome trials ushered in a golden age for understanding the clinical profiles of new type 2 diabetes drugs. Some clinical trials with sodium-glucose cotransporter-2 (SGLT2) inhibitors and glucagon-like peptide 1 (GLP1) receptor agonists reported data demonstrating cardiovascular benefit (decreased risk of major adverse cardiovascular events and hospitalization for heart failure) and slower progression of diabetic kidney disease. This Review discusses current guidelines for use of the 12 classes of drugs approved to promote glycemic control in patients with type 2 diabetes. The Review also anticipates future developments with potential to improve the standard of care: availability of generic dipeptidylpeptidase-4 (DPP4) inhibitors and SGLT2 inhibitors; precision medicine to identify the best drugs for individual patients; and new therapies to protect against chronic complications of diabetes.

Metabolic syndrome (MS) is a symptom complex, the presence of which over the next 5-10 years increases the risk of developing type 2 diabetes mellitus (DM 2) by 5 times, stroke - by 2-4 times, acute myocardial infarction (MI) by 3- 4 times and cardiovascular mortality 2 times [6]

Metabolic syndrome (MS) is one of the most important problems of modern medicine. This is due to the fact that MS has a high risk of mortality [5,7]. Among people with MS, mortality is 20 or more times higher than without MS (2.8). The main components of MS include non-insulin-dependent diabetes mellitus (or impaired glucose tolerance), arterial hypertension, obesity and dyslipidemia. The prevalence of MS among the population in various regions is quite high (10-24%), and in economically developed countries the frequency of MS among the population reaches 35-40% [1,4].

In the pathogenesis of MS, insulin resistance plays an important role, in which pancreatic betta cells increase insulin secretion, as a result of which hyperinsulinemia develops. Excess insulin production increases the activity of the SNS, causes vasoconstriction and an increase in the minute volume of blood circulation, increases the synthesis of VLDL, and forms atherogenic dyslipidemia and obesity.

At the initial stages of the pathological process, hyperinsulinemia compensates for the negative effects of insulin resistance. However, with increased production of insulin, there is a further increase in the degree of insulin resistance. As a result of these processes, a violation of glucose tolerance is formed and subsequently an obvious diabetes mellitus develops.

A close pathogenetic relationship between the various components of MS should be noted. Therefore, the recommendations proposed by the International Diabetes Federation (IDF) in 2006 [3] indicate that in the treatment of MS, lipid-lowering drugs, antihypertensive drugs, and also drugs to reduce insulin resistance and hyperglycemia should be used. It is also necessary to normalize the increased body mass. Therefore, in the treatment, in the primary and secondary prevention of MS, as well as related mortality, adequate pharmacotherapy of the main components of MS is of great importance. Given that in modern conditions the majority of MS patients receive treatment in an outpatient setting, of particular interest is the study of pharmacotherapy and its effectiveness in primary health care.

Purpose of the study.

The study of the adequacy of pharmacotherapy of metabolic syndrome in the primary health care

Research methods.

The analysis includes the results of a population study among the unorganized population of 797 people (242 men and 555 women). MS was diagnosed in the presence of abdominal obesity (waist circumference> 94 cm for men and> 80 cm for women if the body mass index (Quetelet index) exceeds 30 kg / m2, central obesity is assumed, with no need to determine the waist circumference), plus two any other of the following criteria: hypertension (blood pressure> 130/85 mmHg or therapy with previously diagnosed hypertension); hyperlipidemia (cholesterol> 6.1 mmol / L or triglycerides> 1.7 mmol / L); hyperglycemia (on an empty stomach> 5.6 mmol / l; type 2 diabetes or NTG). The United Kingdom Prospective Diabetes Study (UKPDS) demonstrated that enhanced glycemic control is beneficial in T2D. T2D patients were randomized between conventional treatment (diet) and insulin or sulfonylurea for 10 years (6). Patients receiving either insulin or sulfonylureas had lower HbA1c levels (7.0% vs. 7.9%) and experienced 12% fewer diabetes-related endpoints, primarily a 25% decrease in microvascular endpoints. Both insulin and sulfonylureas were associated with increased weight gain and increased incidence of serious hypoglycemia. Overweight patients were randomized between diet and metformin (7). Patients receiving metformin had lower HbA1c levels (7.4% vs. 8.0%) and experienced 32%–36% lower risk of any diabetes-related endpoint, myocardial infarction, and all-cause mortality. Although treatment-associated differences in HbA1c disappeared during the first year of post-trial follow-up (8), risk reductions persisted for 10 years after UKPDS for patients treated with sulfonylureas or insulin: microvascular disease (–24%), myocardial infarction (–15%), and all-cause mortality (–13%). In metformin-treated patients, significant risk reductions persisted for any diabetes-related endpoint (–21%), myocardial infarction (–33%), and death from any cause (–27%).

When assessing the adequacy of treatment for MS, the use of hypolipidemic and antihypertensive drugs in patients, as well as means to reduce insulin resistance, hyperglycemia and body weight, was taken into account.

Results of work and discussion.

The analysis of data on the state of pharmacotherapy of the metabolic syndrome was carried out separately for its main components (Fig. 1). Of all the individuals examined, 18.32% were obese or had a BMI. According to the data obtained, only 0.68% of people with BMI or obesity use pharmacological correction of increased-weight. 4.7% of people in this category use dietary supplements. Dietary and physical activity are used in 32, 19% and 18.49% of cases. It should be noted that half of patients with obesity and BMI (49.32%) do not take any medical and dietary and other measures to reduce weight.

In the examined group, 115 people (14.43%) suffered from diabetes mellitus (2.89%) or had NTG (11.54%).

Almost all cases of NTG were detected for the first time in the course of this study. Therefore, patients with NTG did not know that they had hyperglycemia and did not receive any treatment. It should be emphasized that such an undetectable NTG and, accordingly, the lack of treatment in this group of patients are an important risk factor for cardiovascular morbidity and mortality. Further, the state of treatment of hypertension is considered, the prevalence of which in the population was 20.2%. As it turned out, patients with hypertension prefer pharmacological treatment and insufficiently use dietary measures and physical activity (Fig. 3). It should also be noted that 13.66% of hypertensive patients do not receive any treatment.

According to modern literature, hyperlipidemia significantly increases the likelihood of the formation of cardiovascular diseases and significantly worsens their prognosis. In the examined population, the frequency of hyperlipidemia was 14.43%. However, despite the relatively high prevalence of hyperlipidemia, in no case was there a pharmacological treatment of this component of the metabolic syndrome.

Conclusion

1. Among the unorganized population there is an insufficient pharmacological correction of the main components of the metabolic syndrome.
2. For the correction of such components of MS as hyperlipidemia, NTG and BMI, non-drug methods are not used enough, and pharmacological drugs are practically not used.

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