CURRENT UNDERSTANDING OF TYPE I DIABETES MELLITUS

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Abstract. Diabetes mellitus is an extremely widespread chronic disease, ranking third among the leading causes of death: after cardiovascular and oncological diseases.

Glucose is essential to our body as a source of energy. Glucose enters the body with food and is absorbed in the intestines, and is also produced by the liver on an empty stomach. Insulin is an important hormone produced by the pancreas, it is responsible for transporting glucose from the blood to the cells. In turn, the cells convert glucose into energy. Insulin also regulates the production of glucose by the liver.

The disease is divided into type 1 and type 2.

In type 2 diabetes, the body's cells are less sensitive to insulin, so they do not take up the glucose it carries, and it remains in the blood in excessive amounts. Or, for some reason, insulin no longer effectively regulates glucose production by the liver, so the blood sugar level rises.

In insulin-dependent type 1 diabetes, the immune system destroys the pancreatic cells responsible for insulin production. Thus, insulin does not enter the bloodstream and does not transport glucose into the cells, which remains in the blood. This condition requires insulin to be injected into the body, which is why the first type is called insulin-dependent diabetes mellitus.

Causes of type 1 diabetes mellitus. Type 1 diabetes mellitus (DM) is a disease based on the destruction of beta cells in the pancreas, leading to absolute insulin deficiency and the development of chronic hyperglycaemia (elevated blood glucose levels). The disease usually begins in children and adolescents, with a peak at 10-13 years of age, but can develop in people of any age, including the elderly, although in most cases the disease does manifest before the age of 40.

Genetic predisposition plays an important role in the development of type 1 diabetes, but not everyone who is predisposed to it develops the disease. Triggers - infectious and non-infectious environmental factors - are needed for the disease to occur. Triggers trigger autoimmune processes and start producing antibodies against the body's own cells, including insulin and the cells in the pancreas that produce this insulin.

Infectious triggers include enteroviruses, rotaviruses, rubella, varicella, mumps, viral hepatitis, cytomegalovirus, Epstein-Barr virus, etc. Among the non-infectious triggers that can lead to type 1 diabetes in a predisposed person are dietary constituents (gluten, soy, glucose), infant feeding with cow's milk or mixed cow's milk-based diets,

exposure to heavy metals, nitrites/nitrates, substances toxic to beta cells. Psychosocial factors (stress), ultraviolet radiation, temperature/seasonality also play a role. As a result of autoimmune processes, the beta cells of the pancreas are destroyed, insulin is no longer produced, and absolute insulin deficiency occurs. Clinically, the disease manifests itself when more than 80% of the beta cells are destroyed.

Type 1 diabetes is characterised by an acute onset and rapid progression. In the preclinical stage of the disease, when symptoms are not yet evident, antibodies are already detected in blood tests. At this time the mass of insulin-producing cells gradually decreases, with the development of latent abnormalities in its secretion. Often the appearance of signs of type 1 diabetes is preceded by a viral infection, stress or an overload of easily digestible carbohydratesTypically, 2-4 weeks after a viral infection, the patient has a dry mouth, intense thirst (a person may drink up to 5 litres of water per day, mostly at night and in the morning), an increased appetite, frequent and abundant urination (up to 3 litres of colourless urine per day, usually at night). Lack of insulin causes the body's tissues to lose their ability to utilise glucose, it builds up in the blood (hyperglycaemia), leading to glucose in the urine - glucosuria. The disease is accompanied by general and muscular weakness, marked weight loss with normal or increased appetite, heaviness in the head, visual disturbances, itching of the skin and the smell of acetone from the mouth (if a ketoacidotic state develops).

Complications. The course of type 1 diabetes mellitus is accompanied by many complications. Acute complications that require emergency intervention include hypoglycaemic states up to coma and diabetic ketoacidosis with the development of ketoacidotic coma. Diabetic ketoacidosis results from absolute insulin deficiency. Causes of this complication can include discontinuation of insulin, comorbidities, and infectious diseases. In ketoacidosis all the symptoms of diabetes develop: dehydration with increased thirst, polyuria, widespread abdominal pain, vomiting, acetone breath, impaired consciousness up to and including coma. This condition needs to be treated in an intensive care unit. When blood sugar falls below 3.5 mmol/l, hypoglycaemia is diagnosed. If severe hypoglycaemia develops, the patient may experience restlessness, shivering, nausea and intense hunger. Hypoglycaemia is accompanied by rapid heart rate, cold sweats, copious urination, reduced concentration, headache, panic attack, seizures and impaired consciousness with the development of coma. Severe hypoglycaemia requires hospitalisation and intravenous glucose. Chronic or late complications of diabetes mellitus include micro- and macroangiopathies (lesions of small and large vessels, respectively) and diabetic foot syndrome. When the retinal vessels are damaged, diabetic retinopathy develops, leading to irreversible partial or complete loss of vision. The risk of blindness in diabetic patients is 10-20 times higher than in the general population. One of the most common complications of insulin-dependent type 1 diabetes, ketoacytosis, is the body's attempt to compensate for the lack

of energy (because glucose is not absorbed) by burning fat, which releases ketone bodies.

The presence of large quantities of ketone bodies in the blood is toxic and is manifested by the following symptoms:

- an odour of acetone on the breath,
- dizziness,
- vomiting,
- abdominal pain,
- palpitations,
- loss of consciousness,
- coma.

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