

DIABETES MELLITUS TYPE 1. EARLY DIAGNOSIS AND TREATMENT METHODS

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Abstract. *Diabetes mellitus is an extremely common chronic disease, ranking third among the leading causes of death: after cardiovascular diseases and cancer. Sugar (it would be more correct to call it “glucose”) is necessary for 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 and is responsible for transporting glucose from the blood into cells. In turn, the cells convert glucose into energy. Insulin also regulates the production of glucose by the liver.*

Keywords: *insulin dependence, ketoacidosis, glycosylated hemoglobin, insulin tolerance, insulin pump therapy, pancreas transplant, glycemic variability, nephropathy.*

САХАРНЫЙ ДИАБЕТ 1 ТИПА. РАННЯЯ ДИАГНОСТИКА И МЕТОДЫ ЛЕЧЕНИЯ

Аннотация. *Сахарный диабет — чрезвычайно распространенное хроническое заболевание, занимающее третье место среди основных причин смерти: после сердечно-сосудистых заболеваний и рака. Сахар (правильнее было бы называть его «глюкоза») необходим нашему организму как источник энергии. Глюкоза поступает в организм с пищей и всасывается в кишечнике, а также вырабатывается печенью натощак. Инсулин — важный гормон, вырабатываемый поджелудочной железой и отвечающий за транспорт глюкозы из крови в клетки. В свою очередь, клетки превращают глюкозу в энергию. Инсулин также регулирует выработку глюкозы печенью.*

Ключевые слова: *инсулинозависимость, кетоацидоз, гликозилированный гемоглобин, толерантность к инсулину, инсулиновая помповая терапия, трансплантация поджелудочной железы, вариабельность гликемии, нефропатия.*

In type 1 insulin-dependent diabetes, the body's own immune system destroys the pancreatic cells responsible for producing insulin. Thus, insulin does not enter the blood and does not transfer glucose into the cells, which remains in the blood. This condition requires the introduction of insulin into the body through injections, which is why the first type is called insulin-dependent diabetes mellitus.

Symptoms of type 1 diabetes

Late diagnoses and complications are the result of the fact that the first symptoms are often not given enough attention.

The main first symptoms include:

- a feeling of dry mouth;
- constant thirst;
- frequent urination;
- sleep disturbances due to frequent urge to urinate;
- general weakness, lethargy, fatigue;
- weight loss;
- deterioration of vision.

One of the common complications of insulin-dependent diabetes type 1, ketoacidosis, is the body's attempt to compensate for the lack of energy (since glucose is not absorbed) by burning fat, which releases ketone bodies.

The presence of a large amount of ketone bodies in the blood is toxic and manifests itself with the following symptoms:

- acetone smell from the mouth;
- dizziness;
- vomiting;
- abdominal pain;
- rapid heartbeat;
- loss of consciousness;

coma. Often people go to the doctor only after the first symptoms of ketoacidosis appear, but this complication is life-threatening. Therefore, it is important to know and monitor the appearance of the primary symptoms of type 1 diabetes in yourself or your loved ones, especially children.

Diagnosis of diabetes mellitus type 1

General blood and urine analysis. The glucose level is determined in liquids. Blood is given strictly on an empty stomach, in diabetics the indicator will be higher than normal;

HBA1C analysis. The results show the level of glycosylated hemoglobin. Based on the analysis, the doctor determines how much sugar has been in the body over the past 12 days. This is an important indicator for assessing insulin tolerance in diabetes mellitus type 1; Urine analysis for ketone bodies. The results can be used to judge the severity of metabolic disorders. If the content of ketone bodies is high, the patient should be hospitalized;

Blood test for antibodies to islet cell antigens. The study is necessary for the differential diagnosis of other types of diabetes;

Electrocardiography at rest.

The examination is carried out annually to screen for cardiovascular pathology.

Treatment of the disease

It is impossible to cure the patient completely. Insulin-dependent diabetes mellitus type 1 is a chronic disease that can be controlled by maintaining the quality and usual way of life.

The basis of treatment is insulin therapy. The patient is selected a type of hormone and the dosage for injections is calculated. Injections are given regularly throughout life.

Diet for type 1 diabetes

Nutrition plays a major role in the treatment of the disease. With type 1 diabetes, the patient must give up sweets, flour, and foods with fast carbohydrates. Meals should be fractional and moderate. It is recommended to add more vegetables to the diet.

The best solution is to consult a nutritionist who will help create a balanced menu.

Pump insulin therapy

Modern medicine offers patients with type 1 diabetes an alternative to syringes – the installation of an insulin pump. The compact device is attached to the body and automatically doses the hormone through a catheter. The patient only needs to change empty insulin ampoules for new ones in time.

Pump insulin therapy is indicated in the following situations:

blood glucose level above 7%; history of severe hypoglycemia;

pronounced dawn phenomenon;

low insulin requirements when the hormone is administered in small doses;

presence or risk of developing microvascular complications.

The following conditions must be met for the pump to be installed:

the patient's desire to control and manage the operation of the device;

the initial administration of insulin pump therapy in a hospital setting;

the patient's training in the technical features of the device, methods of adjustment and programming. The installation of the pump is not recommended for patients with insufficient knowledge of type 1 diabetes mellitus, who have difficulties with self-monitoring of glycemia and compliance with medical recommendations.

Conducting insulin therapy using the device is not advisable in the following cases:

primary detection of type 1 diabetes mellitus less than 6 months after manifestation;

lack of desire or ability of the patient to control glucose levels and pump operation;

failure to achieve target indicators or lack of significant reduction in glucose levels within 1 year after the start of pump insulin therapy; a marked decrease in visual acuity that does not allow reading the inscriptions on the device;

unstable mental state of the patient;

exacerbation of chronic pathology or acute somatic disease.

Surgical treatment

One of the new methods of treating insulin-dependent diabetes mellitus is transplantation of the pancreas or individual beta cells. The transplant can only be human. After the organ transplant, the patient must take immunosuppressive drugs for life, which suppress the immune system.

The patient is included in the waiting list for a donor gland in the following cases:
extremely high glycemic variability;

severe complications of diabetes mellitus that reduce quality of life;

severe autonomic dysfunction. Pancreas transplantation is usually performed simultaneously with kidney surgery for end-stage diabetic nephropathy. In other cases, the surgical risks, the likelihood of organ rejection, and the consequences of immunosuppressive therapy are too great and reduce the expected quality and duration of life of the patient after the intervention.

Prevention of complications of type 1 diabetes

The patient can prevent relapses independently by monitoring the blood glucose level. Glucometers are used for this purpose. Self-monitoring is recommended at least 4 times a day: before meals, 2 hours after meals, before bedtime and at night. A glucometer is used before physical activity, driving, before working with complex equipment and other responsible actions. Measuring sugar will also help to adjust the insulin dose in a timely manner.

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