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THE EFFECT OF DIABETES MELLITUS ON THE REPRODUCTIVE SYSTEM OF THE FEMALE BODY

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Abstract

This article describes the methods of studying diabetes mellitus in women, the causes of its occurrence and its effect on the female body. The data of the research literature in electronic search engines are processed and analyzed cyberleninka.ru, eLibrary, in the international Scopus databases for the period 2018-2024.

Keywords

Diabetes mellitus, fertility, reproduction, pregnancy, insulin.

INTRODUCTION

Diabetes mellitus (DM) is a group of metabolic diseases characterized by chronic hyperglycemia resulting from impaired insulin action, insulin secretion, or both [1]. Insulin is produced by β-cells of the pancreatic islets and has unique biological properties. This protein hormone stimulates glycogen synthesis in the liver, glucose utilization by insulin-dependent tissues (adipose tissue, muscles), amino acid transport across the cytoplasmic membrane and protein synthesis, incorporation of fatty acids into triglycerides, and lipid synthesis in adipose tissue. The main regulator of insulin secretion by the pancreas is the blood glucose level [2]. There are 2 types of diabetes mellitus:

In diabetes mellitus type 1 there is absolute insulin deficiency, whereas in diabetes mellitus type 2, gestational diabetes and symptomatic types of diabetes (with thyrotoxicosis, pheochromocytoma, somatotropinoma, hyperadrenocorticism) relative insulin deficiency prevails. Type 1 diabetes mellitus usually occurs in childhood and adolescence as a result of autoimmune damage to the pancreas, leading to the destruction of β-cells of its islet apparatus. Type 1 diabetes is treated by administering insulin against the background of a diet excluding fast-digesting carbohydrates and limiting fats. Type 2 diabetes mellitus develops more often in adulthood and old age and is often combined with obesity. This type of diabetes is treated with a subcaloric (in the presence of obesity) diet, taking hypoglycemic antidiabetic drugs and, less often, by administering insulin. The initial stage of type 2 diabetes mellitus is designated by the term

"impaired glucose tolerance" and is diagnosed using a glucose tolerance test (GTT). With intact glucose tolerance, 2 hours after an oral glucose load (75 g glucose or 50 g glucose per 1 m² of body surface), glycemia does not exceed 7.8 mmol/l (WHO, 1999) [2, 3].

The Purpose of the Study

To study the impact of diabetes on the female body both during and after pregnancy.

METHODS

In addition to anamnesis data, the examination takes into account the level of glucose in the blood on an empty stomach, after meals, at night, in urine, a glucose tolerance test, the level of glycated hemoglobin, the content of fructosamine in the blood and additional studies, as well as tests.

RESULTS AND DISCUSSION

Issues of fertility health in chronic diseases are very relevant for modern medicine, since reproductive dysfunction leads to decreased fertility, complicated pregnancy and poor pregnancy outcomes for both mother and fetus. Diabetes mellitus, one of the most common and dangerous chronic diseases, is accompanied by significant metabolic disorders and the development of systemic vascular complications. Patients with diabetes mellitus have delayed ovulation and a high frequency of menstrual cycle disorders, and if the disease develops before puberty, late menarche and early menopause. Retrospective studies have shown that about 20% of women of reproductive age with diabetes are unable to conceive on their own. Infertility is associated with an earlier onset of diabetes mellitus and a high daily dose of insulin [7, 8, 9].

The causes of decreased fertility in women with diabetes include dysfunction of the hypothalamic-pituitary system: decreased release of luteinizing hormone in response to gonadotropin-releasing hormone, decreased basal concentrations of luteinizing and follicle-stimulating hormones, decreased concentration of thyroid-stimulating hormone, which leads to decreased production of thyroxine and impaired synthesis or release of prolactin, etc. In addition, diabetes mellitus disrupts insulin-dependent processes in ovarian cells due to a decreased effect of gonadotropins on the ovaries. It has been established that in granular cells taken from women with diabetes mellitus, the level of progesterone synthesis is significantly reduced upon insulin stimulation, even under conditions of good compensation of the disease [9].

Patients with diabetes mellitus have an increased incidence of spontaneous abortion in the first trimester and non-viable pregnancies [2, 3, 8] due to both a higher incidence of chromosomal abnormalities and malformations incompatible with life, and abnormal placentation and vascularization of the ovum [8, 9].

Diabetes mellitus has an adverse effect on the course of pregnancy throughout its duration. In the first trimester, pregnancy in type 1 diabetes mellitus is complicated by the threat of termination in 13.4% of cases [4], and in type 2 diabetes mellitus in 36% of cases. Miscarriage is more often observed in women with previous ovarian hormonal insufficiency, with decompensated diabetes. The second half of pregnancy is complicated by gestosis in 60-80% of patients with type 1 and 2 diabetes mellitus [5, 6]. There is a direct relationship between the level of average daily glycemia in the first half of pregnancy and the

severity of gestosis. Severe forms of gestosis are more common in patients with vascular complications of diabetes mellitus [6]. Patients with diabetic nephropathy have a high risk of developing gestosis [5, 6]. Polyhydramnios in diabetes mellitus types 1 and 2 occurs in 20-60% of pregnant women. Reduced immunological reactivity and glucosuria create favorable conditions for the development of urogenital infection. The frequency of urogenital infections in patients with diabetes mellitus types 1 and 2 ranges from 5% to 10% [2]. In women with diabetes mellitus, it is necessary to provide for the following basic measures.

1. When planning pregnancy:

- compensation of diabetes mellitus;
- detection and treatment of late diabetic complications;
- diagnosis and correction of hypertensive complications;
- weight loss in type 2 diabetes;
- detection and sanitation of possible foci of infection;
- diagnosis and treatment of urogenital infections;
- exclusion of congenital thrombophilia, correction of hyperhomocysteinemia;
- regulation of the menstrual cycle, hormonal support of the 2nd phase of the menstrual cycle;
- exclusion of possible teratogenic factors, including the withdrawal of potentially teratogenic drugs (angiotensin-converting enzyme inhibitors, oral hypoglycemic drugs, etc.);
- smoking cessation.

2. In the first trimester:

- compensation of diabetes mellitus;
- diagnosis of late diabetic complications;
- detection and correction of hypertensive complications;
- detection and sanitation of possible foci of infection;
- diagnosis of urogenital infections;
- exclusion of congenital thrombophilia, correction of hyperhomocysteinemia;
- administration of gestagens to ensure full trophoblast invasion;
- exclusion of possible teratogenic factors;
- careful screening during the period of 10-14 weeks of gestation;
- prevention of fetoplacental insufficiency (course administration of antiplatelet agents, anticoagulants);
- weekly monitoring of body weight, if necessary - correction of daily calorie intake.

CONCLUSION

Summarizing all of the above, we can conclude that a violation of carbohydrate metabolism in the female body, especially during pregnancy, can lead to serious consequences that will affect not only the mother's body, but also the child's.

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