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# Women Obesity Pregnant and Assumed Proportions Epidemics Significant Chronic Diseases

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**Abstract**

Obesity is one of the most socially significant chronic diseases, that has taken the magnitude of the epidemic, with increasing attention to obesity in pregnant women. Despite continuous improvement of surveillance system for antenatal and obstetric care, the number of pregnant women with obesity is increasing, in this connection, this problem is of special importance.

The present review covers the basic mechanisms involved in development of obesity and hormonal disorders in pregnancy, the risks and complications associated with obesity in pregnancy. As well as measures for the prevention of excess weight before and during pregnancy.

**Keywords:** obesity, pregnancy, insulinresistance, gestational diabetes.

## Introduction

Obesity is one of the most socially significant chronic diseases, which has assumed proportions epidemics (according to WHO).

Constantly growing - increasing rates of obesity worldwide, as well as obesity-related increased disease bridge and mortality, made it one of the most active teal problems of modern health care, increasing attention to obesity pregnant Despite constant improvements, system of antenatal monitoring and obstetrics opportunities, the number of pregnant women with obesity in the economic developed countries reaches 15.5–26.9% and constantly increases, in connection with which the relevance of this pro- The problem acquires special significance [9].

The main synthesis of sex hormones occurs in the ovaries and adipocytes are the site of extragonad-synthesis of estrogens from androgens by aromatic And rostenedione and testosterone conversion and conversion into estrone, and then it turns into a more active estrogen - estradiol. In obesity, peripheral aromatization of androgens into estrogens increases, in re- resulting in impaired androgen metabolism and estrogens [2, 7].

Estrogen metabolism changes with obesity by reducing the formation of inactive metabolites estradiol, especially 2-hydroxyestrogens, and increased changes in the amount of estrone sulfate, resulting in a change ratio of active to inactive estrogens in favor of active ones and relative hyper-estrogenemia, which can lead to the development of hyperplastic processes of the endometrium and dysfunction ovaries.

The estrogen ratio during pregnancy changed mainly due to increased production, which has low activity, but you is divided in very large quantities, in connection with which it the effect during pregnancy is much stronger, than other estrogens. Estradiol content and estrone during pregnancy increases a hundred times, and - a thousand times [6].

During pregnancy, it increases as production, and androgen inactivation due to increase the rate of their metabolic clearance, which leads to to maintain a normal ratio of levels of cumulating androgens, but in 20-50% of pregnant women with obesity, there may be a significant increase lowering the level of androgens (testosterone, dehydroepiandro- sterone, dehydroepiandrosterone sulfate), and developing

There is hyperandrogenism, which can lead to to miscarriage [3].

Also involved in the regulation of adipose tissue deposition progesterone, the content of which during pregnancy increases. Progesterone is known to compete with glucose cocorticoids for their receptors in adipocytes, thus preventing the lipolytic effect effect of glucocorticoids on adipose tissue.

As a result of increased activity of the hypotalamus - pituitary gland - adrenal glands during pregnancy increased production of tropic hormones (somato- ropnoe, prolactin, adrenocorticotropic hormone (ACTG)). In connection with the increased formation of ACTH, increases the hormonal activity of the adrenal glands, synthesis of glucocorticoids (cortisol) and mine- ralocorticoid (aldosterone), which is adaptation of the female body to the necessary activation of vital processes to meet needs of the developing fetus. Aldosterone in blood circulation increases, starting from the eighth week of pregnancy, and increases up to ten times by childbirth [6]. During pregnancy, the placenta produces hypo- physical-like hormones (chorionic gonadotropin- and corticotropin, placental lactogenic, adreno- corticotropic hormone), hypothalamic hormones (gonadotropic, corticotropic and thyrotrophic rile- zing hormones, somatostatin), adipocyte-specific hormones such as leptin, resisting [11].

Placenta sec- retards a large number of cytokines (interleukin-1, interleukin-6, tumor necrosis factor), growth factors(insulin-like growth factor-1, epidermal factor- growth factor, platelet and fibroblast growth factors, inhibin and activin) and pregnancy-specific proteins necessary for the growth and development of the fetus, immunity relationship between mother and fetus, providing preservation of pregnancy [6, 10].

It has now been proven that leptin in pregnant women synthesized not only by adipocytes, but also by placenta trophoblasts in an amount not less than that of the rheumatic tissue [16]. Placental leptin does not differ in structure and biological properties of leptin fat tissue and is the expression product of the same gene(obgene).

The content of leptin in blood serum is directly correlated correlates with body weight, the level of chorionic gonadotropin human pin and gestational age [16, 19]. Level leptin increases from 6-8 weeks, reaching a maximum in the II-III trimester of pregnancy, and significantly reduced occurs after childbirth [16]. An inverse correlation was also found rational dependence between the content of leptin in the blood circulation of a pregnant woman and the condition of children at birth. In the blood taken from the umbilical cord of the new born, the level of leptin produced by the placenta that, as well as adipose tissue of the fetus, is directly proportional to flax body weight and mass of adipose tissue of the newborn; it is reduced by maternal smoking, fetal prematurity, low anthropometric indicators in children, giving birth on time, and increased in too large newborns data [16]. It is assumed that the main role of the placenta tare leptin is involved in growth regulation and fetal development, stimulation of hematopoiesis and lymphopoiesis in a newborn. Leptin, found in breast milk like of the mother, can also enter the gastrointestinal tract, and then into the blood of the newborn, thereby playing an additional role in the regulation of fetal growth [16].

There is evidence of a role for ghrelin during pregnancy. Ghrelin is a polypeptide hormone secreted by predominantly by cells of the gastric mucosa, causing which creates a feeling of hunger and is a powerful stimulant growth hormone secretion. It is known that receptors for Greek lines are also located in the placenta [13]. Ghrelin level increases with increasing gestational age, reaching maximum by the middle of the second trimester of pregnancy [13].

The main role of ghrelin during pregnancy is maternal appetite regulation and increased intake energy from food to provide nutrition to the fetus. Ghrelin also involved in the regulation of contractile activity myometrium [13].

Despite multiple hormonal and enzymatic dative changes in pregnant women, stimulating

Optimal weight gain during pregnancy recommended by the American Institute of Medicine Academy of Sciences, 1990

**(Table 1)**

| BMI before pregnancy | Weight gain for the entire pregnancy (kg) | Weight gain per week (kg) |
|---|---|---|
| Low body weight (BMI < 20.0) | 12,5 – 18,0 | 0,5 |
| normal body weight (BMI 20.0-25.0) | 11,5 – 16,0 | 0,4 |
| Overweight (BMI 25.0-30.0) | 7,0 – 11,5 | 0,3 |
| Obesity (BMI > 30.0) | < 7,0 | 0,3 |

eduction of adipose tissue, a major role in the development of obesity plays a positive energy balance when pre- has energy intake with food in the body over its expenses. The reason for the energy imbalance is alimentary and hypodynamic factors.

In 1990, the American Academic Institute of Medicine Mii Sciences issued recommendations for the standards of small weight gain during pregnancy, based on baseline body mass index values(BMI) currently in use(Table 1) [15].

According to these recommendations, the greater the initial body weight in a woman, the less this indicator should increase during pregnancy.

In this way, in pregnant women with normal body weight, weight gain body for pregnancy should not exceed 16 kg, and in pregnant obese patients, weight gain should be no more than 7 kg [14].

The dynamics of body weight gain depends on the duration of pregnancy ness.

In the first weeks of pregnancy, weight gain usually not noted, moreover, with the development of early toxicosis may decrease. From the 16th week pregnancy begins a slight increase in weight body; from the 23rd-24th the increase is about 200 g per week, and from the 29th it should not exceed 300–400 g [14].

The presence of obesity during pregnancy is associated with the development of serious complications for the mother and fetus.

Complications associated with obesity are most thorns for women with abdominal obesity (visceral), which in most cases is combined with a complex of hormonal and metabolic disorders and is the most unfavorable in clinical and prognostic aspects [18].

Complications of the gestational process in women with rhenium are noted in 45–85% of cases [6]. In pregnant women one and a half to two times overweight compared to with women with normal body weight, the frequency increases obesity-related diseases, an increased risk pathological course of pregnancy, childbirth and postpartum childbearing period, the frequency of having children increases with congenital malformations, which leads to an increase in rental morbidity and mortality [12].

Most often in pregnant women, cardiovascular common diseases (17.1–43.5%), infectious diseases due to a decrease in immunological resistance organism (51.6–59.7%), diseases of the digestive system (3.8–7.9%), urinary system (4.8–9.9%), respiratory organs (7.1%) [6].

If there are concomitant somatic diseases during pregnancy, their current the condition deteriorates significantly.

Obesity of pregnant women is considered as a non- dependent risk factor for the occurrence of severe forms preeclampsia (hypertension of pregnant women, preeclampsia and lampsia), which are the most common complications during pregnancy.

The frequency of late gestosis, pro- which are an increase in blood pressure more than 140/90 mm Hg, edema and proteinuria, about three times higher in obese women than in women with normal body weight [3, 9].

Development late gestosis in pregnant women is associated with obesity with metabolic changes: endothelial dysfunction and systemic inflammation, especially pronounced in women with abdominal obesity before pregnancy ness, as well as hemodynamic disorders in the swarm half pregnancy. Pregnancy complicated preeclampsia, seven times increases the risk of developing cardiovascular vascular diseases in the mother in the future [6].

It is known that pregnancy in the third trimester is accompanied by is given by physiological hypercoagulability as a result of decrease in natural antithrombotic protection and increased activation of antithrombotic mechanisms nisms leading to an increase in coagulation factors blood, TNF-α level, plasminogen and activity plasminogen activator inhibitor. In pregnant women with obesity due to insulin resistance data changes are more pronounced, and the frequency of development of cardiovascular vascular and thrombotic complications increases.

It is known that elevated levels of TNF-α and inhibitor plasminogen activator are independent factors thrombophilia and the development of thrombosis during pregnancy precariousness [4].

Often diagnosed during pregnancy various disorders of carbohydrate metabolism, including and diabetes mellitus, previously asymptomatic.

With a normal pregnancy in the first trimester insulin sensitivity increases as a result effects of the placental complex itself or light who reduce body weight with preeclampsia. Subsequently, with increasing gestational age, insulin production increased sensitivity of peripheral tissues to insulin decreases and physiological insulin resistance.

These changes are taking place due to the action of contrainsular hormones (placental- lactogen, placental growth hormone), estrogen, progesterone and cortisol, whose action is directed leno to meet energy needs fetoplacental system due to increased lipolysis and ketogenesis to provide the fetus with energy. After childbirth peripheral sensitivity to insulin rapidly recovers to normal [6, 17]. In the presence of obesity before pregnancy, especially dominant, which in most cases is associated occurs with the development of insulin resistance, hyperinsulin and is manifested by various disorders carbohydrate metabolism, the concentration of insulin walkie compared to normal women weight and, consequently, increases the risk of developing disorders changes in carbohydrate metabolism, including gestational diabetes[20]. The risk of developing gestational diabetes in the general population is 2-6%, and in the presence of obesity before pregnancy the value increases to 17%[9]. In turn, gestational chronic diabetes increases the risk of developing type 2 diabetes, which develops in more than a third of women with obesity (30%) within 15 years after childbirth[3, 6]. According to the crit-WHO guidelines, the diagnosis of gestational diabetes is established with an increase in the level of glycemia on an empty stomach in the plasma of venous blood> 7.0 mmol / l and two hours later, against the background of oral glucose tolerance test with 75 g without- aqueous glucose >7.8 mmol/l [3].

Based on the assessment risk factors and careful history taking diabetes in children belt can be diagnosed only in half of the cases teas. According to the American Diabetes association, all women in the presence of factors risk of developing gestational diabetes at 24–28 weeks del pregnancy necessarily carry out oral glucose tolerance test, and in the presence of gestational history of diabetes during a previous pregnancy oral glucose tolerance test children for a period of 16-18 weeks.

Risk factors for development gestational diabetes are: pregnancy large fetus (>4500 g) or stillbirth in history, obesity pregnancy (BMI > 30 kg/m2); polyhydramnios; age over 30 years old; T2D in first-degree relatives stva (parents, siblings, children); fast weight gain during this pregnancy.

Risk of developing complications of gestational diabetes for mother and fetus depends on its compensation.

Inadequate compensation of gestational diabetes leads to the development of hyperglycemia in the fetus, as a result of which in the first trimester of pregnancy, defects can form development of the heart, spine, gastrointestinal tract and spinal cord. In the second trimester of pregnancy hyperplasia develops in response to hyperglycemia cell dysfunction of the fetal pancreas followed by fetal hyperinsulinemia, which can lead to macrosomia, a tendency to severe and prolonged hypoglycemia in the fetus and the formation malformations of the central nervous system Thus, maintaining a woman's normal blood glucose levels during pregnancy, adequate compensation for gestational diabetes are one of the the most important conditions for favorable gestation of the fetus.

Obesity increases the risk of various obstetric complications: threats of miscarriage (32.5%), preterm (10.8%) and late (6.0%) births, anomalies labor activity (30.1%),birth injury(45.7%), as well as violations of the functioning of fetoplates central complex with the development of intrauterine hypo- fetal xia (60%) and fetoplacental insufficiency (10.8%), neonatal macrosomia (18.1%) [1, 9].

The most common obstetric complication in pregnancy obese is miscarriage[9]. Moreover, even excess body weight leads to significant increased risk of miscarriage due to development of hyperandrogenism and hyperinsulinemia.

Frequency miscarriage and spontaneous discharge miscarriages in obese women is 25–37% [9].

With obesity, the frequency of premature intermittent childbirth and recurrent pregnancy. generic dominant in obese women by the end of pregnancy is not completely formed, which leads to 10-15% to prolongation of pregnancy and the development of wee labor activity, the severity of which increases is proportional to the degree of obesity, as a result of which in most cases, operative delivery is used resolution (caesarean section)[9].

In some cases, it is necessary The reason for the caesarean section may be due to discrepancy between the size of the pelvis of the mother and fetus, since obese pregnant women are more likely to have children with macro- somy. Macrosomia of the fetus is determined at a weight of more than 4000 g (90th percentile); the frequency of birth of such children is makes 20 – 44%[9]. In turn, surgical intervention pregnancy (caesarean section) in obese pregnant women is also associated with the risk of developing thrombotic complications, poor postoperative healing scars.

Frequency of operative delivery due to with complicated childbirth in obese women two to four times compared with pregnant women, schism normal weight.

A large number of complications of pregnancy and childbirth are not negatively affects not only the condition of the mother, but also fetal condition. With obesity, the frequency of as- fixation of newborns, congenital anomalies of the fetus, intrauterine death, fetal malformations, birth injury, early neonatal death.

Despite the high risk of developing complications in belt women with overweight, obesity is not a contraindication to pregnancy. When under-preparing for pregnancy and childbirth, a woman needs a thorough examination, observation not only obstetrician- gynecologist, but also endocrinologist, nutritionist; conducting constant monitoring of body weight, blood pressure, the state of carbohydrate metabolism throughout pregnancy.

As already mentioned, one of the reasons for the development of rhenium in pregnant women is overeating, and therefore obligatory observance of dietary recommendations dation and compliance with the regime of physical activity, which can significantly reduce the risk of complications in mother and fetus.

In a metabolic sense, pregnancy is is a state in which anabolic- processes necessary for the formation of new tissues her. There are data emphasizing that exactly nursing during pregnancy is one of the most important components of the health of the unborn child.

Any extreme diet during pregnancy ness, both overeating and undereating can have negative predictable consequences. For example, lack nutrition, especially in the second and third trimesters of pregnancy changes, affects the weight of the fetus at birth. Except of this, nutritional deficiency of the fetus during the intrauterine period development contributes to the formation of metabolism, programmed for possibly poor nutrition in the future, i.e. undated to excess food intake and leading to the accumulation of excess adipose tissue in the postnatal period.

While with a properly balanced diet, adapt powerful physiological mechanisms make it possible to satisfactorily meet the needs of the most pregnant woman, and the fetus in macro- and micronutrients without additional Noah correction.

These mechanisms contribute to a more efficient efficient absorption of nutrients. Yes, mountains changes characteristic of pregnancy(increased levels of estrogen, progesterone, insulin), stimulate the activity of anabolic processes. In pe-period of pregnancy compared to normal women, the content of ho- lecystokinin after a meal, increases the absorption excretion of iron and calcium in the intestine, becomes more effective nitrogen metabolism, which contributes to saving reduction of nitrogen and protein [5, 8].

It is estimated that the increase in energy demand during pregnancy is about 85,000 kcal; of which 41,000 kcal is stored as fat and lean weight in a woman and fetus, on metabolic processes it takes 36,000 kcal, and for such an energy process, as the movement of a heavier body and an increase in a new exchange consumes only 8,000 kcal. Thus zom, when recalculated for 280 days of the gestation period additional average daily energy requirement for a pregnant woman is on average about 300 kcal [5, 8].

It should be noted that the trimesters of pregnancy have different energy requirements, and due to a decrease in physical activity and labor physical loads, despite the increase in physiological needs, ultimately the necessary level The energy consumption increases slightly.

An indicator of adequate satisfaction of needs in energy is the weight gain of the pregnant woman With a balanced rational diet, increase lower energy demand means more consumption of all macro- and micronutrients.

With a normal increase in body weight against the background of9% increase comes from protein mass maternal tissues (uterus, placenta, mammary glands) and fetus [fifteen]. The greatest accumulation of protein mass occurs in the second half of pregnancy and is six-in- seven grams per day[15]. The third trimester of pregnancy is characterized by a decrease in nitrogen excretion in the urine and increased slow protein synthesis.

At this time, the fetus accumulates about three grams of protein per day, and the average daily intake the content in the protein in a woman increases to ten grams.

As for fats, the need only increases in long-chain omega-3 fatty acids, sourced which are seafood, nuts, rapeseed, olive oil, liver, egg yolk, soy products ducts. Moreover, with a properly adjusted nutrition there is no need for additional sources protein and fat.

Increase in plasma volume during pregnancy increased renal filtration, as well as an increase in course and need for vitamins and minerals explains the decrease in their content in the blood. The main The changes concern vitamins A, D, B6 and folic acid. lots, but this process is a normal adaptation of the or- ganism to pregnancy, and with normal nutrition also no need for additional assignment the indicated vitamins. Physical activity plays an important role for pregnant women.

Moderate physical activity (walking 30 minutes per day) reduce the risk of complications during pregnancy pregnancy, such as preeclampsia, gestational die-Beth and others [15].

Prevention of excess weight before pregnancy and during pregnancy itself, including control body weight and various metabolic disorders, maintaining a properly balanced diet and adequate wadded physical activity, will help prevent a range of negative consequences associated with obesity eating during pregnancy Conflict of interest: There is no conflict of interest among the authors.

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