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OBESITY AND METABOLIC SYNDROME AS A CAUSE OF OBSTETRICAL PATHOLOGY

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Abstract:

The problem of obesity is a threat to the health of the population. According to WHO, 1.7 million people on the planet are overweight, and by 2025, 40% of men and 50% of women will be obese. The urgency of the problem lies in the fact that the number of obese people is progressively increasing. In the modern world, obesity and associated type 2 diabetes mellitus, which characterize the development of the metabolic syndrome, are recognized by WHO as non-infectious epidemics due to widespread, high risk of cardiovascular complications, early disability and premature mortality. The purpose of the study is to find out the effects of obesity and metabolic syndrome in women on pregnancy, childbirth, body weight and the condition of newborns. A retrospective analysis of 190 medical records of a pregnant woman, a woman in labor and a parturient who received medical care in a hospital who gave birth in the period from 2015 to 2017 was carried out in the maternity ward of the Simferopol Central Clinical Hospital. Obesity was detected in 4.3% of women from all those who gave birth during this period, of them 1 degree of obesity was diagnosed in 44.7%, grade 2 - in 37.9%, grade 3 - in 17.7% of the subjects, and the pregnant women with obesity 2 and 3 degrees indicate the development of their metabolic syndrome according to WHO criteria. The frequency of chronic arterial hypertension, gestational hypertension and preeclampsia in pregnant women with grade 2 and 3 obesity and metabolic syndrome is significantly higher than in grade 1. There was also a significant increase in deliveries by cesarean section in obese women. In addition, we have identified there is a development of large fetus.

Key words: *Pregnancy; Childbirth; Condition of newborn; Obesity; Metabolic syndrome.*

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INTRODUCTION:

The problem of obesity is a threat to the health of the population. According to WHO, 1.7 million people on the planet are overweight, and by 2025, 40% of men and 50% of women will be obese. The urgency of the problem lies in the fact that the number of obese people is progressively increasing. This growth is about 10% of their previous quantity in every 10 years. In economically developing countries, about 30% of the population is overweight [1, 2]. In the modern world, obesity and associated type 2 diabetes mellitus, which characterize the development of the metabolic syndrome, are recognized by WHO as non-infectious epidemics due to widespread, high risk of cardiovascular complications, early disability and premature mortality [1, 3]. Somatic diseases affect the course of pregnancy, childbirth and the postpartum period. In this regard, recently, the interest of researchers in the problem of metabolic syndrome has increased significantly. The metabolic syndrome occurs in 25–45% of the population of industrialized countries, is widespread among young people, and is among the most common diseases [4, 5].

According to WHO criteria, the development of metabolic syndrome is judged by the presence of at least two criteria: arterial hypertension (blood pressure above 160/90 mm Hg), dyslipidemia, abdominal obesity (body mass index (BMI) of more than 30 kgm2), microalbuminuria. Specialists of a different profile rarely use this diagnosis, as a rule, replacing it with a listing of individual components, such as obesity, arterial hypertension, type 2 diabetes, etc. [2]. According to the literature, there is a large amount of research on the nature of gestational complications in obese women, with hypertension, and in the presence of diabetes. Moreover, it has not been studied which component of metabolic syndrome largely determines the presence or absence of various complications of gestation [6].

It is known that metabolic syndrome in women of reproductive age is often the cause of miscarriage and early loss of pregnancy, polycystic ovary syndrome and anovulatory infertility, hyperplasia and endometrial cancer, and dishormonal diseases of the mammary glands. In the event of pregnancy, a number of complications are described: threatened miscarriage, malnutrition or fetal macrosomia, fetoplacental insufficiency, delayed pregnancy, development of pre-eclampsia, and antenatal fetal death [3, 7, 8]. Frequent and complications in childbirth and the postpartum period: disruption of labor activity, dystocia of the shoulders, bleeding in childbirth and the postpartum period, premature or late rupture of amniotic fluid, high frequency of surgical interventions and induction of labor. Often it is necessary to carry out delivery by cesarean section, the frequency of reproductive losses is high [2]. It is known that performing a cesarean section can be technically difficult in obese women, and the risk of anesthesia complications is significantly increased compared with women of normal weight [21, 22].

Against the background of obesity and in the presence of metabolic syndrome, women often experience menstrual and ovarian function disorders and infertility [8, 9]. It has been proven that there is a direct correlation between the increase in body weight and the severity of ovarian disorders accompanied by anovulation, the luteal phase deficiency and the decreasing rate of pregnancies. However, the controversial question remains about the degree of dependence of impaired reproductive function and the severity of manifestations of the metabolic syndrome [3, 6, 8].

Purpose of the study. To clarify the effects of obesity and metabolic syndrome in women on the course of pregnancy, childbirth and the status of newborns.

MATERIALS AND METHODS:

We carried out a retrospective analysis of 190 medical records of a pregnant woman, a woman in labor and a parturient who received inpatient medical care for obese women who gave birth between 2015 and 2017, in the maternity ward of the State Institution of Health of the Republic of Crimea "Simferopol Central District Clinical Hospital". The criterion for inclusion in the study - women of reproductive age with a BMI of more than 25 kg/m2.

The diagnosis of obesity was carried out on the basis of the body mass index using the Quetelet formula (Quetelet L. A., 1869). The analysis of the degree of obesity, the presence of concomitant extragenital pathology, parity, features of the course of pregnancy, childbirth, body weight and condition of the newborn. All women were divided into groups according to the degree of obesity. A comparison was made between the results obtained in the studied groups, as well as with the average indicators of the maternity ward according to the annual reports.

Statistical processing of the data was performed using standard methods of variational statistical analysis using the standard software package Microsoft Excel and Statistica V.6.0. (StatSoft, Russia). To assess the statistical significance of differences in average values, the Wilcoxon – Mann – Whitney test (p) was used; differences in average values at $p < 0.05$ were considered reliable.

All procedures performed in our research involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

RESULTS:

Obesity grade 1 was diagnosed in 44.7% (n = 84), grade 2 - in 37.9% (n = 73), grade 3 - in 17.7% (n = 33). Chronic arterial hypertension was observed in 10 (5.3%) subjects, gestational hypertension - in 4 (4.8%), 6 (8.2%) and 2 (6.1%) pregnant women with obesity 1, 2 and 3 degrees respectively, preeclampsia - in 1.2%, 4.1% and 5.3% of cases, respectively.

Varicose veins of the lower extremities (In 6.0%, 5.5% and 18.8% of cases, in each grade of obesity respectively) and anemia in pregnant women (In 10.7%, 15.0% and 12.1% of women, in each grade of obesity respectively). Myopia in both eyes was observed in 2.4% of women with grade 1 obesity and 12.1% each in women with grade 2 and 3. Uterine fibroids were detected in 2.7% of pregnant women with grade 2 and in 6.1% of women with grade 3 of obesity.

The first births were in 25 women with 1 degree of obesity (32.5%), in 25 women with 2 degrees of obesity (40%), and in 10 with 3 degrees of obesity (30.3%). The second - in 42 women with obesity of 1 degree (54.5%), in 23 (37%) - 2 degrees, in 15 (45.4%) - 3 degrees. Third and more births in women with grade 1 obesity were 13% (n = 10), with grade 2 obesity - 23% (n = 14), and grade 3 obesity — 24.3% (n = 8).

Deliveries on time were observed in 82 (97.6%) pregnant women with obesity grade 1, 72 (98.6%) - grade 2 and 33 (100.0%) pregnant women with obesity grade 3. 2.4% prematurely and 1.4% of obese women grade 1 and 2.

The incidence of cesarean section in the studied groups was: 21 (25.0%) cases in women with obesity grade 1, 26 (35.6%) cases in women with obesity grade 2, 10 (30.3%) cases in women with obesity grade 3. The most frequent complication of vaginal delivery is perineal tear with grades 1-2: 19% (n = 16), 9.6% (n = 7), 15.2% (n = 5) in pregnant women with obesity 1, 2, and 3 degrees respectively.

75.6% of newborns were born in a satisfactory condition, and 24.4% of newborns were in a state of asphyxia. The mass of newborns born to women with obesity 1 degree was 3385±100 g., 2 degrees - 3657±120 g., 3 degrees - 3780±150 g. The birth of a large fetus was observed in 19% (n = 16) of women with obesity 1 degree, 16.6% (n = 12) - with grade 2 obesity and 33.3% (n = 11) - grade 3.

DISCUSSION:

When analyzing all childbirth histories, obesity with a BMI of more than 25 kg/m2 was detected in 4.3% (n = 190) of women. The average age of obese women was 26.9 ± 5.2 years. When analyzing the data of women in the study group, patients with obesity grade 1 (44.7%) prevailed, there were fewer patients with grade 2 obesity (37.9%), grade 3 obesity was much less common in 17.7%. Chronic arterial hypertension was observed in 10 of the 2-nd and 3-rd degree obese women studied in the group. According to WHO criteria, a combination of obesity and chronic hypertension is indicative of the development of the metabolic syndrome in these women.

We noted a relatively high incidence of gestational hypertension and preeclampsia in pregnant women with obesity grade 2 and 3. It is noteworthy that during the analyzed period, among all women who gave birth, the incidence of chronic arterial hypertension was 0.7%, gestational hypertension - 0.7%, preeclampsia - 1.0%, which is 2-5 times less than in the study groups.

In the structure of concomitant diseases in pregnant women with obesity 1, 2 and 3 degrees, varicose veins of the lower extremities and anemia in pregnant women prevailed, and there were no significant differences in the frequency of these complications between the studied groups. Myopia in both eyes was observed significantly more often with obesity of 2 and 3 degrees than in women with 1 degree of obesity.

Deliveries on time were observed in the vast majority of pregnant women with obesity 1 and 2 degrees and in all pregnant women with obesity 3 degrees. 2.4% and 1.4% of women with obesity 1 and 2 degrees had premature delivery, which is below the average data on the maternity ward - 4.2%.

The frequency of cesarean operations in all women with obesity was significantly higher than the average for the maternity ward (15.7%) - 25.0%, 35.6% and 30.3% in obesity grade 1,2 and 3 respectively. The main indications for abdominal delivery were: narrow pelvis - 56.5% of cases; antenatal distress of the fetus - 26.1%; persistent weakness of labor activity, which is not amendable to drug correction –5.8%. The most frequent complication of vaginal delivery was grades 1–2 of the perineum, with no correlation between the degree of obesity in women and the frequency of perineal tears.

Most of the newborns in the study groups were born in a satisfactory condition, however, 24.4% of newborns were born in a state of asphyxiation. Every third newborn, born to a mother with a third degree of obesity had a body weight of more than 4000 g. Accordingly, we found a tendency of increase in the average body weight of newborns depending on the degree of obesity and the development of the metabolic syndrome in the mother ($p < 0.05$).

There were some studies, which explains pregnancy complications in metabolic syndrome. 10% of the pregnant women had gestational diabetes mellitus [12-19]. 3 to 5% of adolescents who were pregnant, were presentated with gestational diabetes mellitus [20]. In future risk of metabolic syndrome increases with corresponding gestational hypertension. They have also found that 13.9% [21] and 7.6% [22] of preeclampsia cases were found with metabolic syndrome.

CONCLUSION:

Based on a retrospective analysis, obesity was detected in 4.3% of women, of which 1 degree of obesity was diagnosed in 44.7%, grade 2 - in 37.9%, grade 3 - in 17.7% of the subjects, and only part of the pregnant with obesity 2 and 3 degrees indicate the development of metabolic syndrome in them according to WHO criteria. Myopia in both eyes was approximately 5 times more common in women with obesity of grade 2 and 3 than in grade 1. The frequency of chronic arterial hypertension, gestational hypertension and preeclampsia in pregnant women with grade 2 and 3 obesity is significantly higher than in grade 1 obesity and generally in the maternity ward. There was also a significant increase in deliveries by cesarean section in obese women, respectively, increasing its severity. In addition, we have identified a tendency to an increase in the average body weight of newborns and to the development of a large fetus, depending on the degree of obesity of the mother and the development of her metabolic syndrome.

Accordingly, the presence of overweight and the possible development of the metabolic syndrome increase the risk of serious pregnancy complications such as gestational hypertension and preeclampsia, a large fetus, increase in the frequency of operative delivery, and the risk increases with increasing obesity. All this requires a more careful monitoring of the condition of a pregnant woman with obesity and metabolic syndrome, but first of all, it is important to correct the metabolism, dietary patterns and, accordingly, the body weight of a woman at the stage of pregravid preparation.

Conflict of Interest. None Declared

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Ethical clearance. All procedures performed in our research involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

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