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PERINATAL ASPECTS OF DELIVERY OF WOMEN WITH OBESITY AND GESTATIONAL DIABETES

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Summary

Obesity increases the likelihood of hypertension and pre-eclampsia and increases the risk of thrombosis in pregnant women, which can lead to thromboembolism and maternal and fetal death. Obesity most commonly increases the incidence of gestational diabetes mellitus (GDM) in pregnant women. GDM in the setting of obesity can complicate the process of childbirth, causing difficulties during delivery of the fetus (shoulder dystocia, birth trauma, fetal distress, etc.) and increase the rate of cesarean section (CS) delivery.

The aim of the study was to determine the characteristics of the delivery of women with obesity and gestational diabetes mellitus and to optimize the provision of obstetric care to them in order to reduce perinatal complications.

Materials and methods of the study. *Examination, antepartum preparation and delivery of 136 pregnant women were performed, including 33 (24.3 %) obese women (group 1), 35 (25.7 %) obese women and GDM (group 2), 38 (27.9 %) with GDM (group 3) and 30 (22.1 %) women with physiological pregnancy formed the 4th (control) group. The traditional method (PG E2 – dinoprostone intravaginally) followed by induction and the complex method (insertion of a Foley catheter into the cervical canal followed by oral administration of prostaglandin E1 (PG E1) were used to prepare for childbirth.*

The study was conducted in accordance with the principles of good clinical practice (GCP, 1996), the Convention of the Council of Europe on Human Rights and Biomedicine (April 4, 1997), the Declaration of Helsinki of the World Medical Association for the Ethical Principles of Medical Research with Human Subjects (1964-2008), and the Order of the Ministry of Health of Ukraine from 23.09.2009 № 690 (amended by the Order of the Ministry of Health of Ukraine from 12.07.2012 № 523). The draft of the study was discussed and approved at the meeting of the Medical Ethics Committee of KhNMU (Protocol ¹ 23 of November 13, 2024).

Statistics. Statistical processing was performed using the MS Excel software package. The Mann-Whitney U test, mean and standard deviation (M±m), and standard error (p) were used to compare quantitative data. At the level of probability of error (p<0.05), the results of comparisons were considered reliable.

The work was carried out within the framework of the research plan of the Department of Obstetrics and Gynecology No.2 of KhNMU: «Improvement of diagnostic and therapeutic measures and prevention of pregnancy complications and gynecological diseases in women with extragenital pathology (state registration number 0124U002218).

Results. *Doppler examination of the hemodynamics of the fetoplacental complex in pregnant women revealed signs of uteroplacental and fetoplacental circulation disorders in 5 (15.5 %) obese pregnant women, in 8 (22.9 %) women with combined pathology (GDM in the setting of obesity), in 4 (10.5 %) women with GDM, which was considered as placental dysfunction. Fetal anomalies according to CTG with STV (short-term variation) were observed in 6 (18.2 %) obese pregnant women, 5 (15.2 %) women with obesity, and 4 (10.5 %) women with GDM.*

According to the results of ultrasound cervicometry in pregnant women in the control group, the average length of the cervix was 18.7±2.3 mm, which is considered promising for spontaneous delivery. The size of the cervical canal in pregnant women with GDM and obesity was 30.1±2.7 mm, in pregnant women with GDM – 27.3±2.6 mm, in obese women – 25.2±2.9 mm, significantly different from the control group (p<0.05).

Conclusions. *Childbirth in women with obesity and GDM is associated with several obstetric complications, in particular premature rupture of membranes, weakness of labor, fetal distress, clinically narrow pelvis, ineffective induction of labor leading to a high percentage of cesarean sections, and perinatal morbidity (neonatal asphyxia, diabetic fetopathy, hypoglycemia, CNS disorders). Effective completion of pregnancy and delivery without maternal and neonatal complications in women with GDM and obesity depends mainly on the state of the cervix before delivery, which is assessed by various methods (Bishop's scale, cervicometry, optimally using elastography). The best way to prepare for childbirth is a comprehensive process with a Foley catheter and PGE1, and induction with a half dose of oxytocin combined with epidural anesthesia, which reduces the rate of cesarean section and perinatal complications for both mother and fetus.*

Keywords: *Pregnancy; Obesity; Gestational Diabetes Mellitus; Ultrasound Examination; Elastography; Cervicometry; Induction of Labor; Perinatal Complications.*

Introduction

Today, both worldwide and in Ukraine, much attention is paid to the study of pregnancy and childbirth in obese women, who are at high risk for obstetric and perinatal pathology [1, 2, 3]. The incidence of obesity in pregnant women reaches 15-35 % [4, 5]. In recent years, despite martial law, there has been an increase in the incidence of obesity in pregnant women, which is probably associated with stress factors, extragenital pathology, nutritional disorders, etc.

During pregnancy and childbirth, obesity can pose several potential dangers to both mother and child [2, 4, 6]. Obesity increases the likelihood of hypertension and pre-eclampsia, and increases the risk of thrombosis in pregnant

women, which can lead to thromboembolism and maternal and fetal death [4, 7]. In obese women, independent labor activity does not occur until almost 41-42 weeks, leading to miscarriage requiring induction of labor [8, 9, 10]. The risk of developing obesity in pregnant women is three times higher than in women of normal weight [11]. The incidence of cesarean section, which is caused by clinically narrow pelvis, weakness of labor, and fetal distress, increases in proportion to the degree and type of obesity [7]. Obese women have an immature cervix, are 4 times more likely to have a delayed delivery, and are 3 times more likely to have a surgical delivery (especially in the third degree of obesity) than non-obese women [12]. Pregnancy loss in obese women is caused by the accumulation of progesterone in adipose tissue and a 3-4 fold decrease in estrogen levels, a decrease in stress-related hormones, and changes in placental hormone levels. Perinatal morbidity and mortality increase with pregnancy loss [1].

Obesity most commonly increases the incidence of gestational diabetes mellitus (GDM) in pregnant women [13, 14, 15], and its rates increase in parallel with obesity rates [4,16,17,18]. Women with GDM may develop cardiac and cerebrovascular disease, placental dysfunction, preterm or late delivery during pregnancy, and type 2 diabetes mellitus and cardiovascular disease in the postpartum period [19, 20, 21, 22, 23, 24]. It is known that GDM can lead to complications not only for the mother but also for the fetus, including fetal developmental abnormalities, diabetic fetopathy, macrosomia, placental dysfunction, and hypoglycemia, in particular, increasing the risk of developing obesity and impaired glucose tolerance in the future [25, 26, 27, 28]. GDM in the setting of obesity can complicate the process of childbirth, causing difficulties during delivery of the fetus (shoulder dystocia, birth trauma, fetal distress, etc.) and increasing the rate of cesarean delivery (CS) [4, 7, 29].

Effective delivery by natural means requires a mature cervix, since stimulation of uterine activity with an immature cervix leads to fetal distress, weakness or discoordination of uterine activity, and birth trauma for both mother and newborn [5, 8, 9, 10].

Therefore, the study of the processes of preparation for labor and delivery of pregnant women with GDM in the setting of obesity, taking into account the condition of the mother and fetus, is an urgent task of modern obstetrics.

The study aims to determine the peculiarities of delivery of women with obesity and gestational diabetes mellitus, to optimize the provision of obstetric care to them to reduce perinatal complications.

Materials and methods

Examination, antepartum preparation, and delivery were performed in 136 pregnant women, including 33 (24.3 %) obese women (group 1), 35 (25.7 %) obese women and GDM (group 2), 38 (27.9 %) with GDM (group 3), and 30 (22.1 %) women with physiologic pregnancy forming group 4 (control). The degree of obesity was determined by body mass index (BMI) at the time of registration at the antenatal clinic (up to 12 weeks of pregnancy). A woman with a BMI of 25-29.9 kg/m2 was considered overweight2; first degree obesity – 30-34.9 kg/ m2; second degree – 35-39.9 kg/m2; third degree – 40 kg/m2 and above. The diagnosis of GDM was made in accordance with the Uniform Clinical Protocol of Primary and Specialized Medical Care «Type 2 Diabetes Mellitus in Adults», approved by the Order of the Ministry of Health of Ukraine ¹ 1300 of July 24, 2024. The test for GDM was performed at 24-28 weeks' gestation in women who had not previously been diagnosed with diabetes using a one-step strategy, and glycated hemoglobin (HbA1c) was also determined [30,31]. Together with an endocrinologist, we developed tactics for the management of pregnant women and the treatment of GDM (diet, exercise, insulin therapy), which are in line with international guidelines [32, 33, 34]. All women were admitted to the Department of Pregnancy Pathology of the Regional Clinical Hospital for evaluation and delivery. All pregnant women underwent a complete clinical, laboratory and instrumental examination according to the standards of medical care «Normal pregnancy» approved by the Order of the Ministry of Health of Ukraine ¹ 1437 dated August 9, 2022. To determine the status of the fetoplacental complex (FPC), fetal biophysical profile (FPBP), and cervical status (cervicometry, elastography), ultrasound (US) was performed on pregnant women with Doppler ultrasound using a Toshiba (Canon) Xario 200 (Japan). Cardiotocography (CTG) with computer analysis was performed with fetal monitoring, with interpretation of the results according to the Dawes-Redman criteria using the Sonicaid Team 3 device (Huntleigh Healthcare Ltd, UK). Cervical amenability was assessed using the modified Bishop's scale (J. Burnett, 2008), taking into account the following parameters: position of the cervix relative to the anterior axis of the pelvis, its consistency and length, opening of the external cervical os, and position of the fetal head. The cervix was considered mature if the total score was more than 8-13 points, insufficiently mature – 6-7 points, and immature – 0-5 points.

Ultrasound cervicometry is considered a more objective method of cervical assessment at the current stage of obstetrical development. In our study, we followed the developed and standardized methodology for transvaginal measurement of cervical length (The Fetal Medicine Foundation. Cervical assessment) [35] and ISUOG, 2015 [36].

Quantitative measurements of strain elastography were based on the values obtained with the elastography software. Tissue strain within each area of interest was determined by the compression elastography software, presented as a strain curve, and automatically calculated as strain T1 (anterior cervical lip), strain R (posterior cervical lip), and strain T2 (internal cervical ostium). All measurements were performed by an FMF-certified specialist in transvaginal cervicometry and elastography.

Two approaches were used to prepare for childbirth:

– traditional (PG E2 – dinoprostone intravaginally) followed by induction of uterine contractility by intravenous oxytocin 1 ml (5 IU) in 0.9 % sodium chloride solution 500 ml against the background of early amniotomy under the control of CTG in accordance with Appendix

28 to the Standards for the Organisation of Obstetric and Gynaecological Care and Clinical Guidelines [6, 8, 10];

– complex (insertion of a Foley catheter into the cervical canal followed by oral administration of prostaglandin E1 (PG E1))

The results were processed on a PC using the Statistica 10 statistical software.

The study was conducted in accordance with the principles of good clinical practice (GCP, 1996), the Convention of the Council of Europe on Human Rights and Biomedicine (April 4, 1997), the Declaration of Helsinki of the World Medical Association for the ethical principles of medical research with human subjects (1964-2008), and the Order of the Ministry of Health of Ukraine from 23.09.2009 № 690 (amended by the Order of the Ministry of Health of Ukraine from 12.07.2012 № 523). The draft of the study was discussed and approved at the meeting of the Medical Ethics Committee of KhNMU (Protocol ¹ 23 of November 13, 2024).

Statistics. Statistical processing was performed using MS Excel software package. The Mann-Whitney U test, mean and standard deviation (M±m), and standard error (p) were used to compare quantitative data. At the level of probability of error ($p<0.05$), the results of comparisons were considered reliable.

The work was carried out in accordance with the research plan of the Department of Obstetrics and Gynecology No.2 of KhNMU: «Improvement of diagnostic and therapeutic measures and prevention of pregnancy complications and gynecological diseases in women with extragenital pathology (state registration number 0124U002218).

Results of the study and their discussion

All pregnant women lived in Kharkiv region or Kharkiv city, which are considered to be the frontline areas. The age of the studied women was 33.7±2.4 years in group 1, 37.5±3.8 years in group 2, 34.2±4.1 years in group 3, and 28.9±3.6 years in the control group. Among the studied pregnant women of group 1 the third degree of adiposity prevailed (45.5 %), in group 2 the second degree (48.6 %). Gestational age at the time of examination and delivery ranged from 33 to 42 weeks. In group 1, gestational age was mainly 38-42 weeks (93.9 %), in groups 2 and 3 – mainly 34-37 weeks (77.1 % and 78.9 %, respectively), due to complications of GDM and other extragenital or obstetric pathologies (hypertension, thyroid pathology, pre-eclampsia, placental dysfunction, diabetic fetopathy, etc.).

Ultrasound examination of pregnant women revealed that all pregnant women had breech fetuses. Macrosomia was found in 4 (12.1 %) women in group 1, 12 (34.3 %) in group 2, and 6 (15.8 %) in group 3. Diabetic fetopathy was detected in 10 (28.6 %) obese and GDM pregnant women and 3 (7.9 %) GDM pregnant women, respectively, indicating a negative impact of GDM in the setting of obesity on the development of diabetic fetopathy in the fetus, increasing its risk by 3.6 times. Placental dysfunction was diagnosed in 5 (15.5 %) obese pregnant women and in 8 (22.9 %) women with comorbidities (GDM with obesity); in women with GDM, placental dysfunction was found in 10.5 % of cases. Preeclampsia and pre-eclampsia in pregnant women were determined by amniotic index (AI), which was significantly different from the control group ($p<0.05$). The AI was significantly higher in 11 (33.3 %) women in group 2 compared to 8 women with GDM (21.1 %) and 6 obese pregnant women (18.2 %) who had pre-eclampsia.

Doppler examination of the hemodynamics of the fetoplacental complex in pregnant women revealed signs of uteroplacental and fetoplacental circulatory disorders in 5 (15.5 %) obese pregnant women, 8 (22.9 %) women with comorbidities (GDM in the setting of obesity), and 4 (10.5 %) women with GDM, which was considered placental dysfunction.

Examination of the pregnant women revealed a decrease in fetal biophysical profile (FPBP) compared to the control group due to decreased fetal tone, decreased water, decreased respiratory movements and decreased fetal motor activity in 10.9 %, mainly in obese pregnant women.

Fetal abnormalities according to CTG data with STV (short-term variation) were observed in 6 (18.2 %) obese pregnant women, 5 (15.2 %) women with obesity and 4 (10.5 %) women with GDM (Fig. 1, Fig. 2).

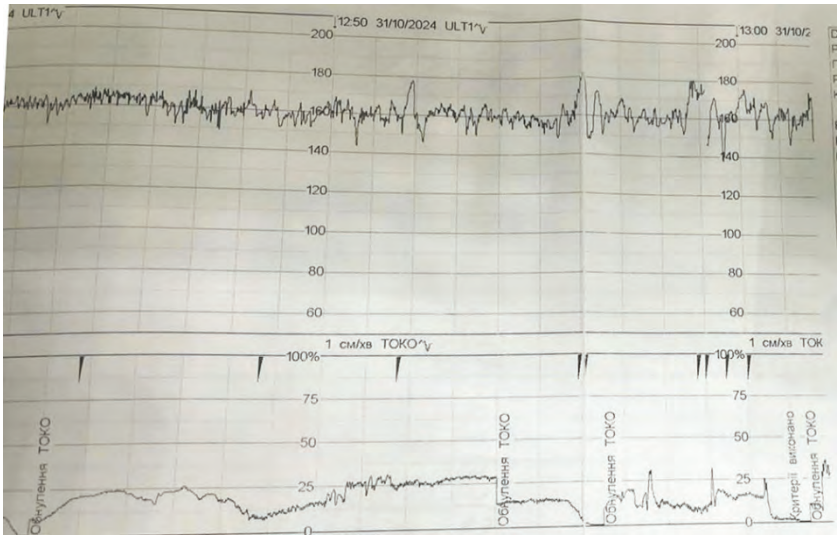

Fig. 1. CTG of the fetus of an obese pregnant woman.

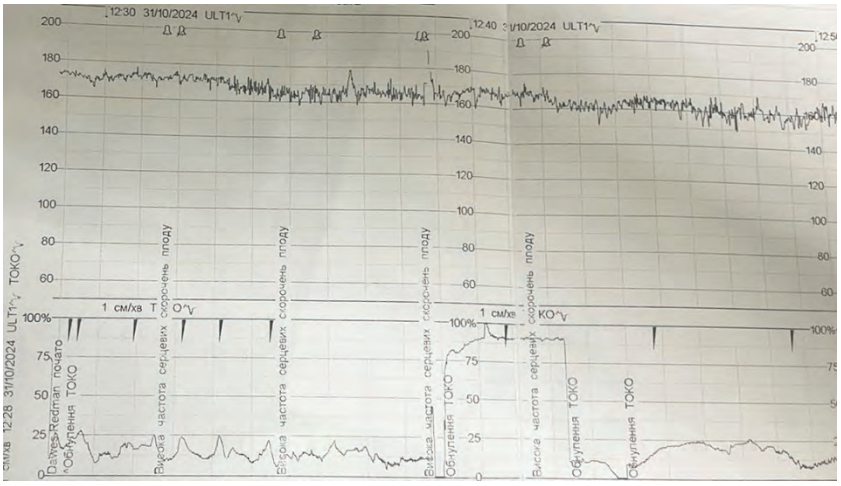

Fig. 2. CTG of the fetus of an obese pregnant woman with GDM.

Thus, according to the results of instrumental examination of pregnant women with obesity and GDM, the presence of diabetic fetopathy, placental dysfunction, fetoplacental and uteroplacental circulatory disorders was determined, which required the need to decide on the timing and method of delivery in order to avoid or reduce the number of perinatal complications.

It is known that for effective delivery it is important to determine the condition of the cervix and its readiness for labor. The cervical condition according to the Bishop-Barnett scale in most pregnant women was less than 7 points, indicating insufficient cervical maturity, with an average score of 4.5±0.4 points. In particular, in obese women the average score was 5.1±0.3 points, in women with GDM – 4.8±0.5 points, in women with GDM and obesity – 3.6±0.3 points. In the control group, this indicator was more than 8 points in all pregnant women. After pre-induction with PGE2, the cervical condition improved by 5.6±0.5 points on average: in obese women, the average score was 5.9±0.2 points, in women with GDM – 6.1±0.3 points, in women with GDM and obesity – 4.8±0.3 points.

After pre-induction by Foley catheter with oral administration of PGE1, the condition of the cervix improved significantly: in obese women, the average score was 9.1±0.3 points, in women with GDM – 10.4±0.2 points, in women with GDM and obesity – 8.5±0.4 points, with an average of 9.3±0.5 points. Thus, preparation for childbirth by the complex method of combining a Foley catheter and PGE1 is more effective and can significantly improve the degree of cervical maturity.

Ultrasound cervicometry is considered a more objective method of cervical assessment at the current stage of obstetrical development. According to the results of ultrasound cervicometry in pregnant women in the control group, the average length of the cervix was 18.7±2.3 mm, which is considered promising for self-delivery. The length of the cervical canal in pregnant women with GDM and obesity was 30.1±2.7 mm, in pregnant women with GDM – 27.3±2.6 mm, in obese women – 25.2±2.9 mm, significantly different from the control group ($p<0.05$).

After preinduction by the standard and our proposed methods, the results are presented in Table 1.

Table 1

Results of ultrasound cervicometry (mm)

Groups	Before preinduction	Preinduction of PGE2	Foley catheter + PGE1
1st (n=33)	25,5±2,9	20,1±1,8	14,9±1,1*
2nd (n=35)	30,1±2,7	23,4±2,2	18,2±1,5*
3rd (n=38)	27,3±2,6	17,5±2,1	12,3±2,4*
Average value	27,6±2,3	22,6±2,3	15,1±1,9*

** p≤0.05 – significantly compared to pre-induction values*

According to cervicometric data, the use of a comprehensive pre-induction method promotes more effective cervical maturation in obese pregnant women with GDM.

Ultrasound cervicometry helps to objectify the measurement of cervical length but does not characterize cervical density, which is important for the outcome of labor.

To objectively determine cervical density, pregnant women underwent ultrasound elastography. In each group, a qualitative and quantitative assessment of cervical density was performed before and after pre-induction using different methods of ultrasound elastography. Before preinduction, the entire cervix or a part of it was stained blue, indicating its density (Fig. 3), after effective preinduction it changed color to green (Fig. 4), yellow or red, depending on the degree of its elasticity (Fig. 5).

It should be noted that after the application of PGE2 there was a greening of the tissue, but the blue color was still present, indicating the density of the cervix and the unsatisfactory effect of the preparation for labor. After using the mechanical method (Foley catheter) in combination with PGE1, the cervix had an almost uniform green color (Fig. 5), which was confirmed by quantitative indicators (Fig. 6).

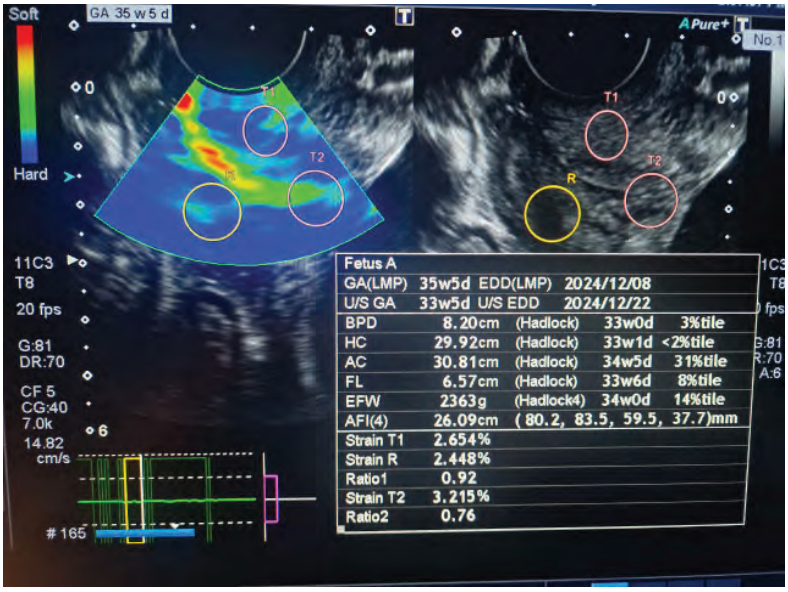

Fig. 3. Elastography before induction.

Fig. 4. Elastography after induction of PGE2.

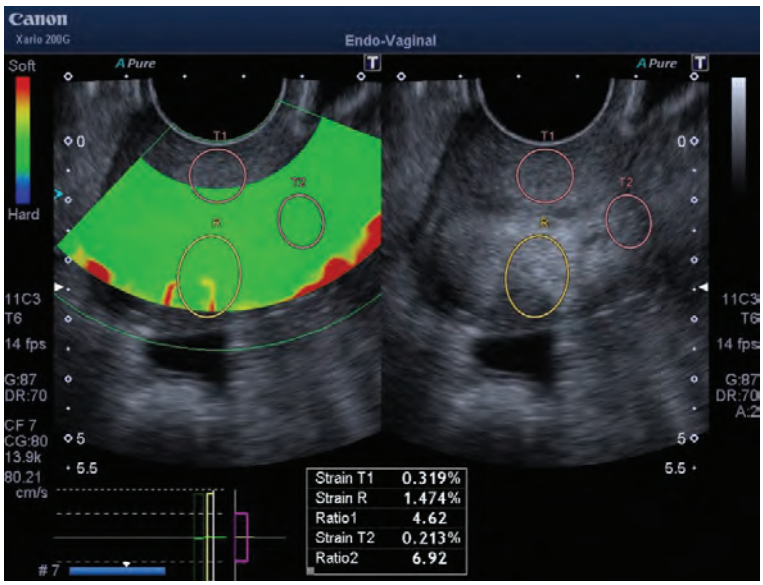

Fig. 5. Elastography after induction by the complex method (Foley catheter + PGE1).

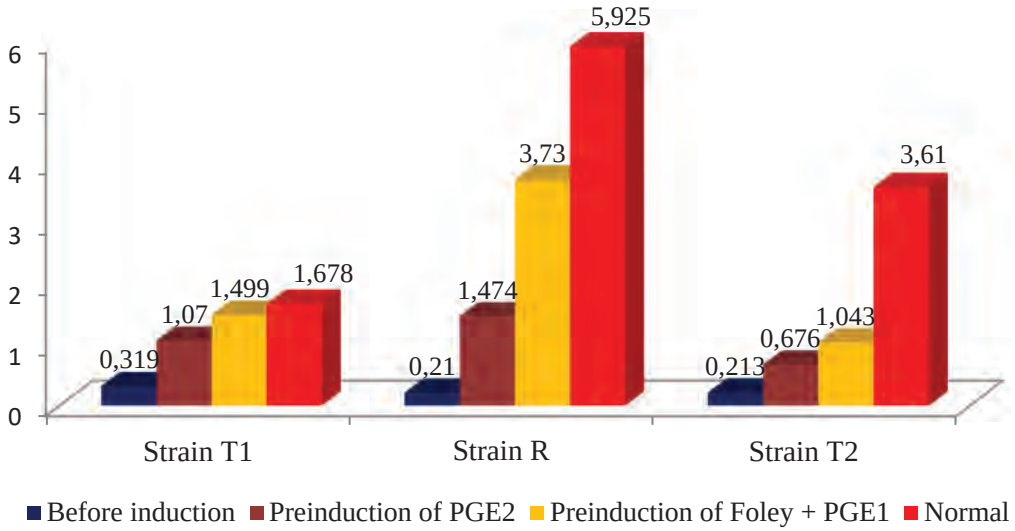

Fig. 6. Quantitative indicators of cervical density before and after pre-induction, %.

Notes: Strain T1 (anterior cervical lip), Strain R (posterior cervical lip), Strain T2 (inner eye).

Thus, sonoelastographic examination in combination with ultrasound measurement of cervical length provides clinically reliable and objective information in predicting the results of preparation for childbirth in pregnant women with GDM and obesity.

Thus, cervicometry more reliably determines the position of the cervix, its length and cervical dilatation, and elastography indicates the degree of cervical tissue density. Together, these methods allow objective determination of cervical maturity, lack of maturity or immaturity on the eve of labor in comparison with the Bishop's scale, which may be due to both the subjectivity of the examination and obesity, which makes vaginal examination difficult.

Thus, cervicometry in combination with elastography can be considered a more reliable and objective method of assessing pre-term cervical maturity, especially in obese pregnant women. The use of a complex method using a Foley catheter with oral administration of PGE1 significantly improves the condition of the cervix compared to the use of PGE2 alone.

As a result of labor preparation with PGE2 (1 mg dinoprostone in the posterior vaginal vault), spontaneous labor began within 24 hours of the method in 4 (12.1 %) women in group 1, 6 (18.2 %) in group 2, and 8 (21.1 %) in group 3. In total, spontaneous labor began in 18 (17 %) women who were prepared with PGE2. As a result of pre-induction with the complex method (Foley catheter followed by PGE1), spontaneous labor started in 10 (30.3 %) women in group 1, 10 (28.6 %) in group 2, and 13 (34.2 %) in group 3. A total of 18 (17 %) women went into spontaneous labor. A total of 33 (31.1 %) pregnant women went into spontaneous labor after using the complex method, which is almost twice as effective as the use of PGE2.

If labor did not start spontaneously, induction of labor was performed. In total, 30 (28.3 %) pregnant women who received PGE2 for labor preparation and 25 (23.6 %) women who received 2.5 IU of oxytocin with epidural anesthesia against the background of a comprehensive method of cervical preparation received oxytocin induction (5 IU). After induction, 16 (29.1 %) women who received PGE2 and 17 (30.9 %) women who received the complex method gave birth spontaneously.

Cesarean section was performed in 14 pregnant women (25.5 %) after PGE2 and in 8 (14.6 %) after the combined method. The reasons for cesarean section were weakness of labor – 7 cases, clinically narrow pelvis, mainly due to macrosomia – 5 cases, and fetal distress – 10 cases, mainly in obese women. It should be noted that fetal distress was most common in pregnant women with GDM and obesity. Depending on the method of preparation for labor and its induction, fetal distress was detected in 7 (23.3 %) fetuses when PGE2 was used and in 3 (12 %) fetuses when the complex method was used, which was an indication for cesarean section.

As a result, cesarean delivery was performed due to ineffective labor stimulation or fetal distress, and obesity increases the percentage of induction and cesarean delivery. My own experience shows that the use of a comprehensive method of labor preparation followed by induction with a half dose of oxytocin (2.5 IU) under epidural anesthesia reduces the rate of cesarean section by 1.75 times.

Thus, the majority of women delivered by cesarean section and induction of labor were obese pregnant women, which is consistent with the data of other researchers [33,36]. The effectiveness of using the Foley catheter in combination with PGE1 was manifested in a greater number of deliveries via the natural birth canal.

A total of 136 newborns were born, including 70 (51.5 %) boys and 66 (48.5 %) girls. Birth weight exceeded 4000 g in 11 (31.4 %) women with GDM and obesity, with a mean of 4170±325 g. Birth weight exceeded 4000 g in 6 (17.1 %) women with GDM, with a mean of 3810±345 g, and in 5 (15.2 %) obese women, with a mean of 3795±365 g.

Assessing the condition of the newborns according to the Apgar score, 11 (31.4 %) infants were born with

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asphyxia of varying severity in pregnant women with GDM and obesity, 5 (13.2 %) in the group with GDM and 3 (9.1 %) in the group with obesity.

Fetal shoulder dystocia in labor was noted in 7 (6.6 %) women with pregnancy pathology caused by fetal macrosomia. Newborn complications in pregnant women with GDM and obesity are most often caused by diabetic fetopathy, which was diagnosed in 13 (12.3 %) newborns. Other perinatal complications in newborns included hypoglycemia (13.2 %), CNS damage (9.4 %), respiratory distress syndrome (8.5 %), and jaundice (5.7 %).

Thus, our results are consistent with those of V. M. Zaporozhan and co-authors [4, 18], who reported that the rates of GDM in pregnant women increase in parallel with the rates of overweight or obesity detected in women before pregnancy. Weight gain and increases in BMI during pregnancy do not affect the development of GDM.

In addition, women with GDM and obesity during pregnancy are at high risk of developing hypertensive disorders and pre-eclampsia, which is consistent with data from other investigators [4, 21]. Pregnant women with GDM often show signs of placental dysfunction, pre-eclampsia, large for gestational age, and weakness of labor, which has been demonstrated in the study of pregnant women with diabetes mellitus [5, 25].

Obese pregnant women have longer labor times, which increases the risk of induction of labor and unplanned cesarean section, especially in first-time mothers, which is consistent with other researchers [4, 9, 11, 12].

At the same time, there are conflicting data regarding the preparation of the cervix for labor and the characteristics of induction (method, time of induction, dose of oxytocin, analgesia) in obese women with GDM [5, 6].

Thus, for the diagnosis of perinatal fetal complications, ultrasound examination of the fetoplacental complex in obese pregnant women with GDM allows us to determine the main ultrasound signs of diabetic fetopathy, placental dysfunction, fetal, fetal-placental, and utero-fetal circulatory disorders. Timely delivery of pregnant women at risk of perinatal complications depends on the condition of the fetus, which is best determined by CTG with STV control, and the condition of the cervix, which is controlled by ultrasound cervicometry and elastography. The effectiveness of preparation for childbirth in pregnant women with GDM and obesity using PGE2 is not always effective, further induction of labor using oxytocin (5 IU) often causes fetal distress, which indicates the need to optimize delivery by natural means by developing effective means of preparing pregnant women for labor using a mechanical method (Foley catheter) in combination with PGE1, which causes independent labor activity and does not require further induction, or induction using a lower dose of oxytocin (2. 5 IU) under epidural anesthesia, which helps to reduce labor complications, such as fetal distress, abnormal labor activity and the frequency of cesarean section, which in turn reduces the number of perinatal complications.

Conclusions. Childbirth in women with obesity and GDM is associated with a number of obstetric complications, in particular, premature rupture of membranes, weakness of labor, fetal distress, clinically narrow pelvis, ineffective induction of labor leading to a high percentage of cesarean section, and perinatal morbidity (neonatal asphyxia, diabetic fetopathy, hypoglycemia, CNS disorders). Effective completion of pregnancy and delivery without maternal and neonatal complications in women with GDM and obesity depends mainly on the state of the cervix before delivery, which is assessed by various methods (Bishop's scale, cervicometry, optimally using elastography). The best way to prepare for childbirth is to use a comprehensive method with a Foley catheter and PGE1, and induction with a half dose of oxytocin combined with epidural anesthesia, which reduces the rate of cesarean section and perinatal complications for both mother and fetus.

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ПЕРИНАТАЛЬНІ АСПЕКТИ РОЗРОДЖЕННЯ ЖІНОК З ОЖИРІННЯМ ТА ГЕСТАЦІЙНИМ ДІАБЕТОМ

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Резюме.

Ожиріння збільшує ймовірність гіпертензивних розладів, прееклампсії, провокує ризик тромбозу у вагітних, що може призвести до тромбоемболії та смерті матері та плода. Найчастіше ожиріння підвищує частоту гестаційного цукрового діабету (ГЦД) у вагітних жінок. ГЦД на тлі ожиріння може ускладнювати процес пологів, викликаючи труднощі під час народження плода (дистоція плечиків, пологовий травматизм, дистрес плода та інші), підвищувати розродження за допомогою кесаревого розтину.

Метою дослідження було визначення особливостей розродження жінок із ожирінням та гестаційним цукровим діабетом (ГЦД) та оптимізація надання їм акушерської допомоги для зниження перинатальних ускладнень.

Матеріали та методи дослідження. Проведено обстеження, підготовка до пологів та розродження 136 вагітних, із яких 33 (24,3 %) жінки з ожирінням, 35 (25,7 %) жінок з ожирінням та ГЦД, 38 (27,9 %) – з ГЦД, ще 30 (22,1 %) жінок із фізіологічною вагітністю склали контрольну групу. Для підготовки до пологів використовували традиційний метод (ПГ Е2 інтравагінально) з наступною індукцію та комплексний (введення катетера Фолея в цервікальний канал із наступним пероральним прийомом простагландину Е1 (ПГ Е1).

Дослідження проводилися відповідно до основоположних принципів належної клінічної практики (GCP, 1996), Конвенції Ради Європи про права людини та біомедицину (4 квітня 1997 року), Гельсінської декларації Всесвітньої медичної асоціації про етичні принципи медичних Дослідження на людях (1964-2008), а також наказ МОЗ України від 23.09.2009 № 690 (зміни внесені наказом МОЗ України від 12.07.2012 № 523). Проект дослідження обговорено та схвалено на засіданні медико-етичної комісії ХНМУ (протокол № 23 від 13 листопада 2024 р.).

Статистична обробка проведена з використанням пакету програм MS Excel. Для порівняння кількісних даних використовували U-критерій Манна-Уітні, середнє значення та середньоквадратичне відхилення (M±m), стандартну похибку (p). При значенні ймовірності похибки ($p<0,05$) результати порівнянь вважали достовірними.

Робота виконана згідно плану НДР кафедри акушерства та гінекології № 2 ХНМУ: «Удосконалення діагностичнолікувальних заходів та профілактики ускладнень вагітності та гінекологічних захворювань у жінок з екстрагенітальною патологією (№ державної реєстрації 0124U002218).

Результати. Допплерометричне дослідження гемодинаміки фетоплацентарного комплексу у вагітних дозволило виявити ознаки порушень матковоплацентарного та фетоплацентарного кровообігу у 15,5 % вагітних із ожирінням, у 22,9 % жінок зі сполученою патологією (ГЦД на тлі ожиріння), у 10,5 % жінок з ГЦД, що було розцінено як плацентарна дисфункція. Порушення стану плоду за даними КТГ із урахуванням STV (short-term variation) спостерігалися у 18,2 % вагітних із ожирінням, у 15,2 % жінок із ГЦД на тлі ожиріння та 10,5 % жінок із ГЦД.

За результатами ультразвукової цервікометрії у вагітних контрольної групи довжина шийки матки у середньому становила 18,7±2,3 мм, що вважається перспективною для самостійного розродження. Довжина цервікального каналу у вагітних з ГЦД та ожирінням дорівнювала 30,1±2,7 мм, у вагітних з ГЦД – 27,3±2,6 мм, у вагітних з ожирінням – 25,2±2,9 мм, вірогідно відрізняючись від контрольних показників ($p<0,05$).

Якісна та кількісна оцінка щільності шийки матки оцінювалася за допомогою ультразвукової еластографії. До преіндукції вся шийка матки або її частина була забарвлена в синій колір, що свідчило про її щільність, після ефективної преіндукції вона змінювала колір на зелений, жовтий або червоний в залежності від ступеню її еластичності.

Усього спонтанна пологова діяльність розпочалася у 17 % жінок, яким підготовку проведено за допомогою ПГЕ2 і у 31,1 % вагітних після застосування комплексного метода. Якщо пологова діяльність не розпочалася самостійно проводили індукцію пологів окситоцином (5 МО) або його половинною дозою (2,5 МО) окситоцину з епідуральною анестезією на тлі комплексного методу підготовки шийки матки.

У стані асфіксії різного ступеня тяжкості народилося 31,4 % малюків у вагітних з ГЦД на тлі ожиріння, 13,2 % – у групі з ГЦД та 9,1 % – в групі з ожирінням. Дистоція плечиків плода в пологах була виявлена у 6,6 % роділь, діабетична фетопатія діагностована у 12,3 % новонароджених від вагітних з ГЦД. Серед інших перинатальних ускладнень у новонароджених зустрічалися гіпоглікемія (13,2 %), ураження ЦНС (9,4 %), респіраторний дистрес синдром (8,5 %), жовтяниця (5,7 %).

Висновки. Пологи у жінок із ожирінням та ГЦД супроводжуються рядом акушерських ускладнень, зокрема, передчасний розрив плодових оболонок, слабкість пологової діяльності, дистрес плода, клінічно вузький таз, неефективність пологозбудження, що зумовлює високий відсоток кесаревого розтину та перинатальної захворюваності (асфіксія новонародженого, діабетична фетопатія, гіпоглікемія, порушення ЦНС). Ефективне завершення вагітності та пологів без ускладнень з боку матері та новонародженого у жінок з ГЦД на тлі ожиріння залежить переважно від стану шийки матки напередодні пологів, оцінку якого проводять різними методами (шкала Бішопа, цервікометрія, оптимально – з використанням еластографії). Підготовку до пологів краще проводити за допомогою комплексного методу з використанням катетеру Фолея та ПГЕ1, а індукцію – половинною дозою окситоцину в комплексі з епідуральною анестезією, що в результаті знижує відсоток кесаревого розтину та перинатальні ускладнення з боку матері та плода.

Ключові слова: вагітність; ожиріння; гестаційний цукровий діабет; ультразвукове дослідження; еластографія; цервікометрія; індукція пологів; перинатальні ускладнення.

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