

Analysis of Clinical Differences Between Preterm Delivery and Full-Term Delivery among Pregnant Women with Gestational Diabetes Mellitus

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Abstract: *Objective:* To investigate the clinical characteristics of preterm delivery and full-term delivery in pregnant women with gestational diabetes mellitus (GDM). *Methods:* Women who were diagnosed with GDM by 75 g glucose tolerance test (OGTT) between 24 and 28 weeks of gestation were selected as the subjects of the study. According to the delivery time, they were divided into full-term group (n = 61) and preterm group (n = 42). *Results:* There was no statistical difference in the puerpera between preterm group and full-term group ($P > 0.05$). The incidence of hyperhydramnios and oligohydramnios in the term group was 16.19% and 2.38%, respectively. The number of hyperhydramnios and oligohydramnios in the full-term group was lower than that in the preterm group, and the difference was statistically significant ($P < 0.05$). *Conclusion:* Prolonged gestation period can effectively reduce the incidence of polyhydramnios and oligohydramnios, and prevent premature delivery, improve the quality of blood glucose management in diabetic patients, avoid hypoglycemia and other complications, and reduce the threat to the life of pregnant women and the fetus.

Keywords: Gestational diabetes; Premature birth; Gestational difference

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1. Introduction

Gestational diabetes mellitus (GDM) refers to the OGTT test of pregnant women with fasting blood glucose levels higher than 5.1 mmol/L, 1h \geq 10.0 mmol/L, 2h \geq 8.5 mmol/L. Generally, GDM does not present any symptoms, so it is easy to be missed out. Some pregnant women can show extreme thirst and increase in frequency of urination. GDM may lead to macrosomia, fetal growth restriction, fetal distress, fetal death in utero; severe effects of GDM include hypoglycemia and diabetic ketoacidosis^[1-2]. In recent years, due to the increase of obese and overweight pregnant women, the incidence of GDM gradually increased. However, there are still many pregnant women who are not aware of the harm and risk of gestational diabetes, resulting in the lack of management of the disease. Education should be given to patients with gestational diabetes and their families, while diet guidance and medication should be given if necessary. Some scholars have pointed out that the probability of increased pregnancy complications due to poor blood glucose control in GDM is about 3 times higher than that of ordinary pregnant women. Therefore, diet and weight management are very important for gestational diabetes patients and has a profound impact on fetal prognosis^[3-6].

2. Data and methods

2.1. General information

A total of 103 women diagnosed with GDM underwent labor examination in the obstetrics department of Shaanxi Provincial People's Hospital from July 2021 to June 2022 and underwent 75 g glucose tolerance test (OGTT) between 24 and 28 weeks of gestation were selected as the research subjects. The pregnant women diagnosed with gestational diabetes were followed up. They were divided into the full-term group (61 cases) and the preterm group (42 cases) based on their delivery time. All patients involved in this study signed an informed consent.

2.2. Methods

An investigation was carried out among the patients using a questionnaire. Meanwhile, the general data of the two groups of pregnant women were retrospectively analyzed to understand the basic situation of pregnant women with gestational diabetes. A food and insulin dosage monitoring checklist was created which includes the fasting blood glucose before meals, postprandial blood glucose, random blood glucose, early morning blood glucose, urine glucose, glycated hemoglobin, and obstetric B-ultrasound, which were monitored daily.

2.3. Observation indicators

General information, changes in blood glucose, whether insulin was treated and the specific dosage, and the polyhydramnios/oligohydramnios ratio during pregnancy were observed.

2.4. Statistical methods

SPSS22.0 statistical software was used for data analysis. The measurement data were calculated as mean \pm standard deviation ($\bar{x} \pm s$), *t*-test was used to compare data between and within groups; χ^2 test was adopted to compare the count data, expressed as n (%); *P* < 0.05 indicated that the difference was statistically significant.

3. Results

3.1. General information

The average age, number of pregnancies, parity, insulin use rate (n, %), family history (n, %), basal body mass index (BMI) in preterm delivery group, gestational weight gain, admission BMI, basic systolic blood pressure (SBP), basic diastolic blood pressure (DBP), admission SBP, admission DBP and admission gestational age were 30.26 ± 3.69 years old, 2.16 ± 1.23 , 1.01 ± 0.69 , 26 (12.94%), 84 (41.79%), 21.36 ± 4.01 kg/m², 14.23 ± 3.45 kg, 26.21 ± 3.69 kg/m², 104.92 ± 9.01 mmHg, 68.25 ± 6.89 mmHg, 117.69 ± 10.36 mmHg, 70.36 ± 14.01 mmHg, 36.98 ± 2.01 weeks, respectively. Age (years), pregnancy, birth, insulin use rate (n, %), family history (n, %), basic BMI in full-term group, gestational weight gain, admission BMI, basic SBP, basic DBP, admission SBP, admission DBP and admission gestational age were 29.69 ± 4.01 years old, 1.89 ± 1.02 , 1.12 ± 0.45 , 11 (18.03%), 30 (49.18%), 20.98 ± 4.01 kg/m², 15.01 ± 3.24 kg, 26.69 ± 3.61 kg/m², 105.01 ± 9.12 mmHg, 69.02 ± 6.78 mmHg, 117.01 ± 10.45 mmHg, 69.98 ± 13.96 mmHg, 38.21 ± 1.98 weeks, respectively, as shown in **Table 1**.

Table 1. General data analysis

Index	Preterm group (n = 42)	Full-term group (n = 61)	P
Age (years)	30.26 ± 3.69	29.69 ± 4.01	> 0.05
Number of pregnancies	2.16 ± 1.23	1.89 ± 1.02	> 0.05
Parity	1.01 ± 0.69	1.12 ± 0.45	> 0.05
Insulin utilization, n (%)	16 (37.21%)	11 (18.03%)	0.0229
Family history, n (%)	24 (57.14%)	30 (49.18%)	> 0.05
Basic BMI (kg/m ²)	21.36 ± 4.01	20.98 ± 4.01	> 0.05
Weight gain during pregnancy (kg)	14.23 ± 3.45	15.01 ± 3.24	> 0.05
BMI on admission (kg/m ²)	26.21 ± 3.69	26.69 ± 3.61	> 0.05
Basic SBP (mmHg)	104.92 ± 9.01	105.01 ± 9.12	> 0.05
Basic DBP (mmHg)	68.25 ± 6.89	69.02 ± 6.78	> 0.05
Admission SBP (mmHg)	117.69 ± 10.36	117.01 ± 10.45	> 0.05
Admission DBP (mmHg)	70.36 ± 14.01	69.98 ± 13.96	> 0.05
Gestational age (weeks)	35.98 ± 2.01	38.21 ± 1.98	> 0.05

3.2. Polyhydramnios/oligohydramnios ratio during pregnancy

The proportion of polyhydramnios/oligohydramnios in the preterm delivery group was 26.23%/6.56%. The ratio of polyhydramnios/oligohydramnios in full-term group was 16.19%/2.38%. Besides, the incidence of polyhydramnios and oligohydramnios in full-term pregnancy was significantly lower than that in preterm pregnancy group, the difference was statistically significant ($P < 0.05$), indicating that the proportion of polyhydramnios and oligohydramnios in pregnant women with GDM was significantly reduced after dietary and behavioral intervention and drug treatment when necessary, and the probability of preterm birth was significantly reduced.

4. Discussion

GDM is a condition of hyperglycemia caused by insulin resistance of diabetic pregnant women, which has adverse effects on both the mother and the fetus. Therefore, blood sugar should be controlled to reduce or prevent complications. Due to the rapid growth of the fetus in the third trimester of pregnancy, it is easy to gain weight rapidly and increase blood glucose levels, causing difficulties in controlling weight and glucose levels. The risk of preterm delivery in pregnant women with GDM has increased, especially with the implementation of the two-child policy, the incidence of GDM is increasing year by year, and the risk factors include advanced age, obesity, history of gestational diabetes, preeclampsia, and many more. Therefore, it is necessary to raise awareness towards GDM through providing sufficient education on that matter. In addition, it is necessary to pay attention to pregnant women with risk factors of GDM; they should exercise reasonably during pregnancy, maintain their physical strength, keep their blood glucose under control and gain weight reasonably while ensuring the normal growth of the fetus [7-11].

4.1. Maintain a reasonable diet

Pregnant women with GDM should strictly control their caloric intake in the second trimester of pregnancy, and the recommended daily caloric intake should be less than or equal to 2000 kcal/d. Meanwhile, some low-glycemic foods or mixed foods can be selected to help reduce blood glucose. Constant blood glucose monitoring and corresponding treatment will be needed to keep blood glucose in an ideal state. Their diet should be adjusted if their blood glucose rises in the second trimester. Their blood glucose should be monitored, and hypoglycemic treatment should be carried out if necessary. If blood glucose is stable, it is

necessary to further observe whether the normal value can be reached or to continue the treatment. Patients with GDM in the second trimester can continue pregnancy under the premise of effective hypoglycemic treatment. The difference in delivery mode between GDM and normal pregnant women may be related to maternal BMI and lifestyle during pregnancy. Therefore, it is necessary to maintain reasonable exercise and avoid the simultaneous existence of multiple risk factors such as obesity, high blood glucose level, and preeclampsia. For pregnant women with preeclampsia whose gestational age is less than 34 weeks, drugs promoting fetal lung maturation can be prescribed. For those with poor blood glucose control, insulin injection, and other treatments can be considered. For patients with hyperglycemic coma and ketoacidosis, targeted treatment should be given, and the pregnancy should be terminated as soon as possible to ensure the safety of the mother and fetus ^[12-13].

4.2. Control blood sugar

The blood glucose of GDM patients should be well-controlled; especially for patients with preeclampsia, their blood glucose should be well-controlled and magnesium sulfate spasmolysis should be given to prevent the occurrence of eclampsia. Treatment to promote fetal lung maturation and fetal growth and development should be given when necessary, depending on the gestational age and size of fetus. Patients with simple GDM should also follow a diversified diet and exercise appropriately. Regular monitoring of blood glucose should be carried out to guide clinical treatment, especially pregnant women with other complications who need active clinical intervention to reduce the incidence of complications. Therefore, it is of great importance to strengthen the risk-factor screening of pregnant women, timely control of blood glucose and avoid the occurrence of high-risk pregnancy. Sufficient attention should be paid to GDM patients with small increase in blood glucose, and follow-up monitoring and therapeutic intervention should be carried out during pregnancy to ensure the safety of pregnant women and the fetus. Blood glucose control plays an important role in preventing and reducing severe complications in pregnant women with gestational diabetes. The blood glucose control range after pregnancy is no more than 5.3 mmol/L fasting blood glucose and no more than 6.7 mmol/L 2 hours postprandial blood glucose. Rational use of insulin in patients with gestational diabetes can effectively control the level of glycosylated hemoglobin and prevent the occurrence of complications such as ketoacidosis. When applying insulin, pay attention to blood glucose detection and be alert to dawn phenomenon to avoid hypoglycemia. Drugs such as sulfonylureas affects glycemic control, increase the risk of premature birth, and may even lead to fetal death. Therefore, more attention should be paid to blood glucose control and management of pregnant women with diabetes in the middle and late stages of pregnancy, and rational selection of diabetes drugs should be made to avoid inappropriate drug use ^[14-15].

4.3. Strengthen nutritional guidance during pregnancy

Hyperglycemia can lead to abnormal fetal development, increased abortion rate, and can cause macrosomia, intrauterine growth restriction, fetal distress, fetal death in utero, and other situations. Pregnant women who fail to control their blood sugar are at risk of infection. For pregnant women with GDM, attention should be paid to their poor immunity. The nutritional problems of pregnant women and fetuses should also be taken seriously. After pregnancy, pregnant women themselves and their families will generally enhance nutrition for pregnant women. Unreasonable diet will cause great fluctuation of blood sugar during pregnancy, so nutritional support and guidance should be strengthened. Besides, it is recommended for pregnant women to incorporate supplements of protein, calcium, iron, zinc and other nutrients, vitamins, and trace elements in their daily diet. At the same time, regular monitoring of blood glucose is recommended, and early treatment is recommended in case of abnormal blood glucose levels. In addition, some scholars have shown that nutritional imbalance in early pregnancy is also one of the main factors

leading to gestational hyperglycemia and GDM. Therefore, it is particularly important to address nutrient deficiency and other factors in the early stage of a pregnancy to prevent gestational hyperglycemia and GDM.

4.4. Active prevention and treatment of complications

Preterm delivery patients are often accompanied with diabetic ketoacidosis, hyperlipidemia, hypertension, and other conditions, which can cause neonatal hypoxemia, and is even life-threatening in severe cases. Therefore, in addition to actively preventing hypoglycemia for patients with premature delivery and full-term delivery, blood glucose monitoring and hypoglycemia prevention measures for patients with high glucose diet should be strengthened under the guidance of doctors, so that they can have a smooth pregnancy. At the same time, insulin dose and type should be adjusted according to blood glucose and other physiological indicators, and hypoglycemic treatment should be given to those with high blood glucose. Full-term delivery can effectively reduce the risk of neonatal death and improve the quality of life. Therefore, in clinical practice, it is necessary to strengthen the monitoring of premature delivery and full-term delivery and perform active prevention and treatment, timely take measures to prevent premature delivery and postpartum complications, improve maternal and infant health level, and reduce maternal and infant mortality and perinatal mortality.

5. Conclusion

In conclusion, prolonged gestation period prevents preterm delivery of more than one month.. Besides, the quality of blood glucose management in patients with diabetes should be improved to avoid hypoglycemia and complications and avoid the occurrence of life-threatening situations for both the mother and the fetus.

Disclosure statement

The authors declare no conflict of interest.

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