

Study on the Correlation between Standardized Treatment and Perinatal Outcomes in Pregnancy Complicated by Hypothyroidism

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Abstract: *Objective:* To explore the impact of standardized treatment on perinatal outcomes in pregnant women with hypothyroidism, and to clarify the correlation between the two to provide a reference for clinical diagnosis and treatment. *Methods:* 160 pregnant women with hypothyroidism who were admitted to our hospital from January 2021 to December 2025 were selected and divided into a standardized treatment group and a conventional treatment group, with 80 pregnant women in each group, using the random number table method. The conventional treatment group adopted the traditional hypothyroidism treatment plan, and the standardized treatment group implemented standardized treatment intervention. After treatment, the two groups of pregnant women were compared on thyroid function indicators, occurrence of adverse perinatal outcomes, and neonatal health indicators. *Results:* After treatment, the level of thyroid-stimulating hormone in the standardized treatment group was lower than that of the conventional treatment group, and the levels of free triiodothyronine and free thyroxine were higher than those of the conventional treatment group ($P < 0.05$). The overall incidence of adverse perinatal outcomes in the standardized treatment group was lower than that of the conventional treatment group, and the newborn weight and Apgar score were higher than those of the conventional treatment group ($P < 0.05$). *Conclusion:* Standardized treatment for pregnant women with hypothyroidism can effectively improve thyroid function, reduce the risk of adverse perinatal outcomes and improve newborn health. The two are closely related and have clinical promotion value.

Keywords: Pregnancy complicated by hypothyroidism; Standardized treatment; Perinatal outcomes; Thyroid function; Neonatal health

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1. Introduction

Hypothyroidism is a clinical multiple endocrine and metabolic disease. Changes in the body's hormone levels and increased metabolic needs during pregnancy significantly increase the probability of thyroid dysfunction in pregnant women^[1]. If pregnancy complicated by hypothyroidism fails to receive timely and effective intervention, the lack of

thyroid hormone secretion will interfere with maternal metabolic processes and fetal nervous system development, while increasing the likelihood of adverse perinatal outcomes such as gestational hypertension and premature birth, posing a serious threat to maternal and infant health^[2]. There are currently different clinical intervention plans for pregnancy complicated by hypothyroidism. Traditional treatments rely mostly on experience to adjust medication dosage and lack systematic standards, making it difficult to ensure stable treatment effects^[3]. Standardized treatment focuses on dynamically adjusting the intervention plan based on the pregnant woman's gestational age and thyroid function indicators to achieve individualized and accurate intervention. Based on this, this study selected pregnant women with hypothyroidism admitted to our hospital as the research subjects to explore the relationship between standardized treatment and perinatal outcomes, with the purpose of providing a reference for optimizing clinical intervention programs to improve maternal and infant prognosis.

2. Materials and methods

2.1. General information

160 pregnant women with hypothyroidism admitted to our hospital from January 2021 to December 2025 were selected as the research subjects and divided into two groups using the random number table method. The standard treatment group included 80 pregnant women, aged 22 to 35 (28.62 ± 3.24) years old and with gestational age of 6 to 12 (8.56 ± 1.32) weeks. The conventional treatment group included 80 pregnant women, aged 23 to 36 (29.15 ± 3.18) years old and with gestational age of 6 to 13 (8.82 ± 1.26) weeks. The basic information of the two groups of pregnant women was comparable, $P > 0.05$. Inclusion criteria: (1) diagnosed with pregnancy complicated by hypothyroidism; (2) singleton pregnancy ≤ 12 weeks of gestation; (3) voluntarily participate in this study and sign an informed consent form. Exclusion criteria: (1) combined with other endocrine diseases; (2) severe heart, liver, kidney and other organ dysfunction; (3) combined with complications such as gestational diabetes and hypertension.

2.2. Method

The conventional treatment group adopted the traditional hypothyroidism intervention program. After diagnosis, levothyroxine sodium tablets were taken orally and the initial dose was set at 50 $\mu\text{g}/\text{d}$. During the treatment process, thyroid function-related indicators were reviewed every 4 weeks and the dosage was adjusted empirically based on the test results.

The standardized intervention measures taken by the standardized treatment group are as follows:

- (1) Individualized medication planning: After diagnosis, the pregnant woman's gestational age, weight and thyroid function indicators are evaluated in detail, and the initial dose is adjusted according to the level of thyroid-stimulating hormone. For those with thyroid-stimulating hormone < 10 mIU/L, 25–50 $\mu\text{g}/\text{d}$ left thyroid Sodium tablets are taken orally, and those with thyroid-stimulating hormone ≥ 10 mIU/L are given 50–75 $\mu\text{g}/\text{d}$ orally;
- (2) Dynamic monitoring and adjustment: During the treatment period, thyroid-stimulating hormone, free thyroxine and other indicators are reviewed every 2–3 weeks, and the dosage is accurately adjusted based on changes in indicators and gestational progress. Thyroid hormone is controlled at 0.1–2.5 mIU/L, in the second trimester it is controlled at 0.2–3.0 mIU/L, and in the third trimester it is controlled at 0.3–3.0 mIU/L;
- (3) Pregnancy control: Regularly carry out pregnancy health care guidance, including dietary conditioning, psychological counseling, etc., and guide pregnant women to take in appropriate amounts Use iodine-containing foods to avoid iodine deficiency or excess, and monitor fetal heart rate, fetal movement, etc. to detect abnormalities in a timely manner;
- (4) Delivery and postpartum intervention: Before delivery, comprehensively assess the condition of the mother and baby to formulate an appropriate delivery plan, adjust the dosage according to thyroid function indicators after delivery, and follow up on the newborn's thyroid function and growth and development.

2.3. Observation indicators

The thyroid function indicators of the two groups of pregnant women after treatment were compared, including thyroid-stimulating hormone, free triiodothyronine, and free thyroxine; the adverse perinatal outcomes of the two groups were compared, including gestational hypertension, premature birth, premature rupture of membranes, and low birth weight infants; the neonatal health indicators of the two groups were compared, including birth weight and Apgar score 1 min after birth. The higher the score range, 0 to 10, the better the neonatal condition.

2.4. Statistical methods

Data were analyzed using SPSS24.0. Measurement data that conform to normal distribution are expressed as mean plus or minus standard deviation and subjected to t test; count data are expressed as a percentage and subjected to χ^2 test. $P < 0.05$ represents a significant difference.

3. Results

3.1. Comparison of thyroid function indicators between the two groups after treatment

After treatment, the level of thyroid-stimulating hormone in the standard treatment group was lower than that in the conventional treatment group, and the levels of free triiodothyronine and free thyroxine were higher than those in the conventional treatment group ($P < 0.05$). See **Table 1** for details.

Table 1. Comparison of thyroid function indicators between the two groups after treatment (mean \pm SD)

Group	Thyroid-stimulating hormone (mIU/L)	Free triiodothyronine (pmol/L)	Free thyroxine (pmol/L)
Conventional treatment group ($n = 80$)	3.26 \pm 0.85	3.12 \pm 0.45	12.56 \pm 1.32
Standard treatment group ($n = 80$)	2.15 \pm 0.62	3.58 \pm 0.52	14.85 \pm 1.46
<i>t</i>	9.437	5.983	10.406
<i>P</i>	0.000	0.000	0.000

3.2. Comparison of the incidence of adverse perinatal outcomes between the two groups

The overall incidence rate of adverse perinatal outcomes in the standardized treatment group was lower than that in the conventional treatment group ($P < 0.05$). See **Table 2** for details.

Table 2. Comparison of the incidence of adverse perinatal outcomes between the two groups [n (%)]

Group	Hypertension during pregnancy	Premature birth	Premature rupture of membranes	Low birth weight infant	Overall incidence
Conventional treatment group ($n = 80$)	9 (11.25)	8 (10.00)	7 (8.75)	10 (12.50)	34 (42.50)
Standard treatment group ($n = 80$)	2 (2.50)	3 (3.75)	2 (2.50)	3 (3.75)	10 (12.50)
χ^2					18.056
<i>P</i>					0.000

3.3. Comparison of newborn health indicators between the two groups

The birth weight and Apgar score of newborns in the standard treatment group were higher than those in the conventional treatment group ($P < 0.05$). See **Table 3** for details.

Table 3. Comparison of newborn health indicators between the two groups (mean \pm SD)

Group	Newborn birth weight (g)	Apgar score 1 min after birth (points)
Conventional treatment group ($n = 80$)	2856.32 \pm 325.65	8.25 \pm 0.85
Standard treatment group ($n = 80$)	3215.46 \pm 356.78	9.12 \pm 0.56
<i>t</i>	6.650	7.645
<i>P</i>	0.000	0.000

4. Discussions

Pregnancy complicated by hypothyroidism is a multiple complication during pregnancy. As a key regulatory hormone of the body, thyroid hormone plays a very important role in maternal metabolic processes, immune function and fetal growth and development, especially the development of the nervous system. Abnormal maternal thyroid function during pregnancy can cause insufficient thyroid hormone secretion, which in turn affects placental function and fetal nutritional supply, and increases the possibility of adverse perinatal outcomes. Therefore, scientific and effective intervention methods to improve thyroid function are of great significance to ensure the safety of mothers and infants. With its individualized and accurate intervention characteristics, standardized treatment has gradually gained attention in the treatment of hypothyroidism during pregnancy. The results of this study confirmed that this treatment model is closely related to perinatal outcomes and can significantly improve maternal and fetal prognosis^[4].

In this study, after treatment, the thyroid-stimulating hormone level of the standardized treatment group was lower than that of the conventional treatment group, and the levels of free triiodothyronine and free thyroxine were higher than those of the conventional treatment group. This result was mainly because standardized treatment broke through the limitations of traditional empiric medication and developed a personalized medication plan based on maternal gestational age, weight, and initial thyroid function indicators to avoid poor treatment effects caused by too high or too low initial doses^[5]. At the same time, dynamic monitoring is implemented during the treatment process to review thyroid function indicators every 2 to 3 weeks, so that changes in indicators can be grasped promptly and the dosage of medication can be accurately adjusted to ensure that thyroid function indicators are controlled within the ideal range during different pregnancy periods. Thyroid-stimulating hormone is controlled at 0.1–2.5 mIU/L in the first trimester, 0.2–3.0 mIU/L in the second trimester, and 0.3–3.0 mIU/L in the third trimester. This strict control standard can ensure adequate secretion of maternal thyroid hormone and meet the metabolic needs of both mother and baby. However, the conventional treatment group is reviewed every 4 weeks, and the dose adjustment lacks clear specifications, making it difficult to achieve accurate regulation of thyroid function, so there is a significant gap in treatment effects.

The occurrence of adverse perinatal outcomes is closely related to maternal thyroid function status. The results of this study show that the overall incidence rate of adverse perinatal outcomes in the standardized treatment group is 12.50%, which is significantly lower than 42.50% in the conventional treatment group. There is a big difference between the two groups. This result fully shows that standardized treatment can effectively reduce the risk of adverse perinatal outcomes. Analysis of the reasons shows that sufficient secretion of thyroid hormone can improve maternal blood circulation and placental function, reduce the occurrence of hypertension during pregnancy, and at the same time, sufficient thyroid hormone can provide a good internal environment for fetal growth and development, and reduce the probability of premature birth and low birth weight infants^[6]. Pregnancy management measures in standardized treatment also play

an important role. Dietary conditioning guides pregnant women to eat an appropriate amount of iodine-containing foods to avoid further deterioration of thyroid function caused by iodine deficiency. Exercise guidance and psychological counseling can improve the mother's physical condition and psychological emotions, and reduce the impact of adverse factors on pregnancy. The conventional treatment group only focused on drug treatment and lacked systematic pregnancy management, making it difficult to fully avoid risk factors for adverse perinatal outcomes, so the incidence of adverse outcomes was relatively high^[7].

Neonatal health indicators are an important part of evaluating perinatal outcomes. In this study, the birth weight and Apgar score of newborns in the standardized treatment group were higher than those in the conventional treatment group, indicating that standardized treatment can significantly improve the health of newborns. The growth and development of the fetus, especially the development of the nervous system, depend on the supply of maternal thyroid hormone. Normal maternal thyroid function can ensure the normal development of fetal brain tissue and improve the health of the newborn after birth^[8]. Standardized treatment ensures adequate thyroid hormone secretion at all stages of pregnancy by accurately regulating thyroid function indicators, providing a stable hormonal environment for fetal growth and development, promoting fetal weight growth and improving physical functions, so newborns have higher birth weights and better Apgar scores. However, the conventional treatment group had poor thyroid function control, and the fetus's growth and development were inhibited in an environment of insufficient thyroid hormone for a long time, resulting in low birth weight and a relatively low Apgar score of the newborn. Judging from the actual clinical diagnosis and treatment situation, the standardized treatment of hypothyroidism in pregnancy focuses on multi-faceted, full-cycle intervention ideas. It not only focuses on the accuracy of drug treatment, but also pays attention to the systematicness of pregnancy management and postpartum follow-up, forming a full-process diagnosis and treatment system from diagnosis to postpartum. The implementation of this treatment model requires clinicians to fully understand the control standards of thyroid function in different periods of pregnancy, formulate personalized treatment plans based on the individual conditions of pregnant women, and, at the same time, strengthen communication with pregnant women to improve their treatment compliance and ensure the effective implementation of various treatment and nursing measures.

During clinical application, attention should also be paid to further optimizing treatment plans for pregnant women with other underlying diseases to avoid conflicts between treatments for different diseases. At the same time, multidisciplinary collaboration, including endocrinology, obstetrics and gynecology, etc., should be strengthened to provide comprehensive diagnostic and treatment services for pregnant women. In addition, standardized treatment can also provide a standardized reference basis for the clinical diagnosis and treatment of pregnancy complicated by hypothyroidism, reduce the instability of treatment effects caused by differences in the diagnosis and treatment plans of different doctors, and improve the standardization and homogeneity of clinical diagnosis and treatment. The conduct of this study further clarified the relationship between standardized treatment and perinatal outcomes and provided a strong evidence-based medical basis for clinical promotion of standardized treatment programs. In subsequent clinical work, the sample size can be further expanded, the follow-up time can be extended, and the impact of standardized treatment on the long-term growth and development of newborns can be further explored, so as to provide a more comprehensive reference for continuously optimizing treatment plans.

5. Conclusion

In summary, standardized treatment for pregnant women with hypothyroidism can effectively improve thyroid function, significantly reduce the risk of adverse perinatal outcomes, and improve neonatal health. Standardized treatment is closely related to good perinatal outcomes. Therefore, standardized treatment plans should be actively promoted in clinical diagnosis and treatment, and thyroid function monitoring and full-process management during pregnancy should be strengthened to provide strong support for ensuring the safety of mothers and infants, which has a very important clinical application value.

About the author

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Disclosure statement

The author declares no conflict of interest.

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