Efficacy of Vitamin D drops in Combination with Menthol Insulin Injection in the Treatment of Gestational Diabetes Mellitus

Lingyan Zhang, Qianjing Dong*
Shaanxi Provincial People's Hospital, Xi'an 710068, Shaanxi, China

Abstract: This study aims to improve the clinical efficacy of gestational diabetes mellitus as the research objective, the implementation of vitamin D drops combined with mentholated insulin injection treatment programme in the clinic, and to clarify its impact on gestational diabetes mellitus patients. A total of 95 cases of gestational diabetes mellitus patients who received treatment in the hospital in the time period of 2023.01-12 were analyzed, and were set into a control group (49 cases) and an observation group (46 cases) according to the order of treatment, and the interventions were carried out in the form of menthyl insulin injection and vitamin D drops combined with menthyl insulin injection, respectively, and the interventions were analysed. In terms of adverse pregnancy outcomes, the total value was lower in the observation group compared with the two groups ($P<0.05$). In terms of glycolipid metabolism indexes, the total values were lower in the observation group compared to the two groups ($P<0.05$). In terms of inflammatory response, the values were lower in the observation group compared to the two groups ($P<0.05$). The implementation of vitamin D drops combined with insulin injection is beneficial to improving the outcome of gestational diabetes mellitus, stabilising glycolipid metabolism indexes, and reducing the inflammatory response.

***Keywords*:** Gestational diabetes mellitus; Vitamin D drops; Mentholated insulin injection

1. Introduction

Gestational diabetes is a type of diabetes that occurs in women during pregnancy, usually when a pregnant woman develops high blood glucose levels during pregnancy but did not have diabetes before pregnancy. If the condition of patients with gestational diabetes is not effectively controlled, it can increase the risk of pregnancy complications, such as hypertensive disorders, macrosomia, and preterm labour, threatening the health of the mother and voice[1] . Therefore, it is necessary to pay attention to and strengthen the research on the treatment of gestational diabetes mellitus to ensure the therapeutic effect and provide protection for the safety of mothers and infants[2] . In the paper, with the aim of improving the clinical efficacy of gestational diabetes mellitus, vitamin D drops combined with menstrual insulin injection treatment programme was implemented in the clinic to clarify its effects on patients with gestational diabetes mellitus, as follows.

2. Information and methodology

2.1 General information

A total of 95 cases of gestational diabetes mellitus who were treated in the hospital during the time period 2023.01-12 were analysed, and the control group (49 cases) and observation group (46 cases) were set up according to the order of treatment. In terms of age range, age of the two groups: 20 years old ≤ age ≤ 34 years old, the average value of the observation group (27.43 ± 4.33) years old, the average value of the control group (27.45 ± 4.31) years old; gestational weeks, the two groups: 28 weeks ≤ gestational weeks ≤ 41 weeks, the average value of the observation group (34.01 ± 0.12) weeks, the average value of the control group (34.03 ± 0.10) years. Comparability was confirmed after processing the data information related to the basic data of the two groups by the statistical system ($P>0.05$). This study was agreed and approved by the ethical committee of the hospital. Selection requirements: comprehensive clinical diagnosis of gestational diabetes mellitus; complete data. Exclusion requirements: withdrawal in the middle of the study.

2.2 Methodology

2.2.1 Intervention in the control group with a treatment regimen of menthyl insulin injections

Drug choice Mentholatum Insulin Injection [Manufacturer: Novo Nordisk (China) Pharmaceutical Co., Ltd, Approval No.: State Pharmaceutical Permit J20170033, Specification: 3ml/branch*1branch/box], Method of use: take subcutaneous injection to give the drug, each time 0.5U-kg-1 , the drug is used every day before eating, in the actual treatment, it is necessary to combine with the actual situation of the patient on the use of the dose to be adjusted appropriately. The drug

should be used until delivery.

2.2.2 Intervention of the observation group with vitamin D drops combined with menthol insulin injection regimen

Mentholated insulin injection was used in the same way as the control group. Vitamin D Drops [Manufacturer: Sinopharm Holding Star Shark Pharmaceutical (Xiamen) Co., Ltd, Approval No.: State Pharmaceutical Permit H35021450, Specification: Each capsule contains 400 units of vitamin D], Method of use: Oral use, each dose of 400 U, once a day. The medication is continued until delivery.

2.3 Criteria for judgement

(1) Statistics on the occurrence of adverse pregnancy outcomes, such as giant babies, preterm babies, miscarriages, and low-birth-weight babies in the two groups. (2) Detect fasting blood glucose index, 2h postprandial blood glucose index, glycated haemoglobin, total cholesterol, low-density lipoprotein cholesterol and other glycolipid metabolism indexes in the two groups. (3) Detect the inflammatory response indicators such as interleukin-6, calcitoninogen and C-reactive protein in both groups.

2.4 Statistical methods

Data were analysed using SPSS 20.0 software. t and ` x±s are measures obeying normal distribution in continuous variables, chi-square and % are counts, and $P < 0.05$ is considered statistically significant or valuable.

3. Results

3.1 Analysis of adverse pregnancy outcomes

In terms of adverse pregnancy outcomes, the total value was lower in the observation group compared to the two groups ($p<0.05$). As shown in Table 1.

Table 1. Comparison of adverse pregnancy outcomes in the two groups (n,%)

Groups	A large baby	Premature baby	Have a miscarriage	Low-birth-weight child	Gross
Observation group (n=46)	0	0	0	0	0 (0.00)
Control group (n=49)	1	1	0	1	3 (6.12)
X2					6.313
P					0.011

3.2 Analysis of glycolipid metabolism indicators

Regarding the glycolipid metabolism indexes, the values were lower in the observation group compared to the two groups ($P<0.05$). As shown in Table 2.

Table 2. Glycolipid metabolism indexes comparing the two groups ($\bar{x}$ ±s)

Groups	Fasting blood glucose (mmol/L)	2h postprandial blood glucose (mmol/L)	Glycosylated haemoglobin (%)	Total cholesterol (mmol/L)	LDL cholesterol (mmol/L)
Observation group (n=46)	4.34±0.41	4.99±1.01	5.04±0.31	2.53±0.27	2.28±0.13
Control group (n=49)	5.83±0.55	6.61±1.11	6.01±2.01	3.06±0.38	2.92±0.55
t	14.893	7.424	3.236	7.790	7.690
P	0.001	0.001	0.001	0.001	0.001

3.3 Inflammatory response analysis

In terms of inflammatory response, the values were lower in the observation group compared to the two groups ($p<0.05$). As shown in Table 3.

Table 3. Comparison of inflammatory response in the two groups ($\bar{x}$ ±s)

Groups	Interleukin-6 (ng/L)	Calcitoninogen (ng/L)	C-reactive protein (mg/L)
Observation group (n=46)	62.13±3.15	62.13±3.15	10.03±1.11
Control group (n=49)	77.15±5.46	77.15±5.46	52.63±6.26
t	16.283	16.283	45.474
P	0.001	0.001	0.001

4. Discussion

From the clinical situation, patients with gestational diabetes mellitus will have obvious glycolipid metabolism and inflammatory response due to the disease, which will not only reduce the quality of life of patients, but also easily lead to adverse pregnancy outcomes. In the actual treatment, it is necessary to pay attention to the changes of patients' glycolipid metabolism indexes and inflammatory response indexes to improve the pregnancy outcome, so as to provide reference for the clinical efficacy assessment[3] .

Clinical patients with gestational diabetes mellitus will mainly take Mentholatum insulin injection to help patients control their condition. The specific mechanism of action is as follows: in the case of gestational diabetes mellitus, the insulin secretion of pregnant women is affected, resulting in increased blood glucose, through the injection of Mentholatum Insulin, can make up for the lack of insulin secretion, to promote the entry of glucose into the cells, lowering the level of blood glucose; through regular injections of Mentholatum Insulin, can maintain the blood glucose in a reasonable range, reduce the impact of gestational diabetes mellitus on the foetus; Mentholatum Insulin Injection can help reduce the burden on pancreatic beta cells, protect their function, and prevent insulin resistance and insufficient insulin secretion. However, a single drug cannot effectively improve the therapeutic effect and cannot meet the patients' therapeutic needs. Vitamin D drops is an oral supplement containing vitamin D. Vitamin D plays a variety of important physiological roles in the human body, including promoting the absorption and utilisation of calcium and phosphorus, maintaining bone health, and regulating the function of the immune system. Studies have shown[4] that vitamin D can affect blood glucose levels by regulating insulin sensitivity. Vitamin D deficiency may lead to insulin resistance, and proper supplementation of vitamin D can improve insulin sensitivity and help control blood glucose levels. Vitamin D has an anti-inflammatory effect, which can reduce the inflammatory response and improve insulin resistance and insulin secretion function. In patients with gestational diabetes mellitus, an increased inflammatory response may lead to increased blood glucose, and the anti-inflammatory effect of vitamin D may help to reduce blood glucose levels[5] . In addition, appropriate vitamin D supplementation may promote foetal bone development and prevent conditions such as vitamin D deficiency in pregnant women and newborns. In the treatment of gestational diabetes mellitus, the use of vitamin D drops combined with menthol insulin injection can enhance the effect of the drug, effectively reduce the indicators of glucose and lipid metabolism, reduce the inflammatory response of the body, reduce the incidence of adverse pregnancy outcomes, and enhance the efficacy and safety of the treatment[6] . Combined with the results of the study in the article, in terms of adverse pregnancy outcomes, compared with the two groups, the total value of the observation group is lower ($P<0.05$). In terms of glycolipid metabolism indexes, compared with the two groups, the observation group had lower values ($P<0.05$). In terms of inflammatory response, the values were lower in the observation group compared to the two groups ($P<0.05$). It is suggested that the application of vitamin D drops combined with the treatment programme of menthyl insulin injection in the treatment of patients with gestational diabetes mellitus is more effective. The reason is that Mentholatum insulin injection effectively treats gestational diabetes, reduces the risk of maternal and infant complications, and ensures the health of mothers and infants through the mechanisms of promoting the entry of glucose into cells, controlling blood glucose levels, and protecting the function of pancreatic islet β-cells[7] . Meanwhile, the application of vitamin D drops to the treatment of gestational diabetes mellitus helps to control blood glucose levels, prevent complications, and improve pregnancy outcomes through mechanisms of action such as regulating insulin sensitivity, decreasing inflammatory responses, and improving maternal and fetal health[8] . However, the number of cases included in the paper is small and there are limitations, and further analysis of the value of the application is needed to clarify the effect.

In conclusion, the implementation of vitamin D drops combined with menthol insulin injection treatment protocol in clinical practice is beneficial for improving gestational diabetes mellitus pregnancy outcome, stabilising glycolipid metabolism indexes, and reducing inflammatory response.

References

[1] LEE Pei-Pei, LIN Xian-Zhu, CHEN Jun. Effectiveness of dextran insulin combined with menopausal insulin in the treatment of gestational diabetes mellitus[J]. Clinical Rational Use of Drugs,2023,16(15):116-118.

[2] Zhang Rui. Effect of Mentholated Insulin Injection Combined with Exercise Therapy on Blood Glucose Levels in Patients with Gestational Diabetes Mellitus[J]. Maternal and Child Health Guide,2023,2(13):102-104.

[3] LI Jing, CUI Jingjing. Observations on the value of different modes of insulin administration combined with vitamin D in optimising pregnancy outcomes in pregnant women with gestational diabetes mellitus[J]. Health Friends,2022,11(8):66-67.

[4] ZHAO Wen, YU Changyan, WU Xiaofei. Clinical study of vitamin D drops combined with menthol insulin injection in the treatment of gestational diabetes mellitus[J]. Special Health,2023,9(15):287-288.
[5] WANG Hui, MEI Lina, SHI Weiqin, et al. Clinical study of vitamin D drops combined with menthol insulin injection in the treatment of gestational diabetes mellitus patients[J]. Chinese Journal of Clinical Pharmacology,2022,38(15):1719-1722.
[6] WEI Xiaoxia,WANG Jianping,MA Xiaojuan. Study on the effectiveness of vitamin D drops and Mentholatum insulin injection in the combined treatment of gestational diabetes mellitus[J]. Self-care,2023,27(5):117-118.
[7] Xie Xiaoyun, Wu Lizhen, Chen Shoufang, et al. Clinical efficacy and safety of vitamin D drops combined with menthol insulin injection in the treatment of gestational diabetes mellitus[J]. Diabetes mellitus new world,2023,26(21):114-117.
[8] YIN Guoying,LI Huamin. Effectiveness of vitamin D drops combined with menthol insulin injection in the treatment of gestational diabetes mellitus[J]. Diabetes World,2023,9(3):25-26.