Effect of gestational diabetes on the fetal fat metabolism

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ARTICLE INFO

Article history:
Received
Received in revised form
Accepted
Available online

Keywords:
gestation, diabetes, fat metabolism, blood sugar

ABSTRACT

Objective: To explore the differences of insulin, leptin, umbilical blood sugar, and adiponectin levels among the pregnant women receiving gestational diabetes treatment, not receiving gestational diabetes treatment, and the pregnant women with mild gestational diabetes.

Methods: A total of 120 pregnant women with gestational diabetes who were admitted in our hospital from May, 2011 to July, 2012 were included in the study and randomized into three groups, i.e. gestational diabetes group, gestational diabetes control group, and gestational diabetes treatment group, with 40 cases in each group. The pregnant women in the three groups were given routine care. On the basis of routine care, the pregnant women in the treatment group were given blood sugar monitoring and diet control, and insulin treatment was provided if necessary. Then the insulin, leptin, umbilical blood sugar, and adiponectin levels in the three groups were detected.

Results: The leptin level in the diabetes group was significantly higher than that in the control group and the treatment group \((P<0.05)\), while the adiponectin level and adiponectin / leptin ratio were significantly lower than those in the control group and the treatment group \((P<0.05)\). The adiponectin level in the treatment group was significantly lower than that in the control group \((P<0.05)\). The comparison of FBG among the three groups was not statistically significant \((P>0.05)\). The blood sugar levels after breakfast, lunch, and dinner in the treatment group and control group were significantly lower than those in the diabetes group \((P<0.05)\). The blood sugar levels after breakfast, lunch, and dinner in the control group were significantly lower than those in the treatment group \((P<0.05)\).

Conclusions: Gestational diabetes can give rise to a certain effect on the fetal fat metabolism by altering the leptin, blood sugar, and adiponectin levels. The related treatment on the patients can effectively control this alteration, enhance the clinical efficacy, and deserve a wide recommendation.

1. Introduction

With the development of economic globalization, more and more attention is paid to the diet and health, but the number of people visiting a clinic is increasing, including the pregnant women whose health is associated with the infants \(^1\). However, gestational diabetes can produce a large effect on the infants, and the life safety of the fetus will be threatened if the condition is not timely controlled; therefore, it should be highly valued. A comprehensive treatment is conducted on the pregnant women with gestational diabetes who were admitted in our hospital from May, 2011 to July, 2012, and the results are reported as follows.

2. Materials and methods

2.1. General data

A total of 120 pregnant women with gestational diabetes who were admitted in our hospital from May, 2011 to July, 2012 were included in the study and divided into three groups, i.e. gestational
diabetes group, gestational diabetes control group, and gestational diabetes treatment group, with 40 cases in each group. After an OGTT test, all the pregnant women were diagnosed with gestational diabetes. The 40 cases in the gestational diabetes group were aged from 22 to 35 with an average age of 27.61±5.43, a gestational age of 36-43 weeks, and an average week of 38.92±2.74. The 40 cases in the control group were aged from 21 to 34 with an average age of 26.18±4.89, a gestational age of 37-42 weeks, and an average week of (39.12±2.56). The 40 cases in the treatment group were aged from 23 to 36 with an average age of 27.18±4.89, a gestational age of 36-42 weeks, an average week of (38.72±2.48). The comparison of age and gestational week among the three groups was not statistically significant (P>0.05), and it was comparable.

2.2. Treatment methods

The weight, delivery times, age, etc in each group were recorded in detail. A certain amount of umbilical cord blood was collected when delivering, and was centrifuged at 4°C. Then the contents of serum insulin, leptin, and adiponectin were detected one by one. After coagulation, the heparin sodium was given a centrifugation. Moreover, the hexokinase method was used to detect the content of plasma glucose in the clinic. Leptin, insulin, and adiponectin were placed in the kits for determination [2].

2.3. Statistical analysis

SPSS 10.0 was used for statistical analysis. The measurement data were expressed as mean±SD, and the enumeration data were expressed as percentage. ANOVA was used for comparison of the results among the groups. P<0.05 was regarded as statistically significant.

3. Results

3.1. Comparison of adiponectin and leptin among the three groups

The leptin level in the diabetes group was significantly higher than that in the control group and the treatment group (P<0.05), while the adiponectin level and adiponectin / leptin ratio were significantly lower than those in the control group and the treatment group (P<0.05). The adiponectin level in the treatment group was significantly lower than that in the control group (P<0.05) (Table 1).

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<thead>
<tr>
<th>Table 1</th>
<th>Comparison of adiponectin and leptin among the three groups</th>
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<td>Groups</td>
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<tr>
<td>Diabetes group</td>
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<td>Treatment group</td>
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<td>Control group</td>
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* P<0.05, when compared with the gestational diabetes group; ^P<0.05, when compared with the control group.

3.2. Comparison of blood glucose level among the three groups

The comparison of FBG among the three groups was not statistically significant (P>0.05). The blood sugar levels after breakfast, lunch, and dinner in the treatment group and control group were significantly lower than those in the diabetes group (P<0.05). The blood sugar levels after breakfast, lunch, and dinner in the control group were significantly lower than those in the treatment group (P<0.05).

<table>
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<th>Table 2</th>
<th>Comparison of blood glucose level among the three groups</th>
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* P<0.05, when compared with the gestational diabetes group; ^P<0.05, when compared with the control group.

4. Discussion

The pregnant women’s health is closely related with the fetus, but in recent years, many pregnant women are suffering from gestational diabetes which can not only give rise to a certain effect on the pregnant women but also impose a great threat to the health of the fetus; therefore, it should be highly valued [3, 4]. The pathogenic factor for developing gestational diabetes is that too little insulin secretion will lead to the blocking of hepatic glycogen degradation, under which the amino acids and fat can not be converted to glucose; therefore, the contents of fat and blood sugar in the pregnant women’s body will be increased, meanwhile, the fetus will also be affected, specifically manifested in a change of these substances,
a rapidly fetal growth due to hormone and insulin in the body, resulting in an obesity and mental decline [3, 6].

An effective control of leptin, blood sugar, and adiponectin levels is required for a normal fetal growth. Leptin and insulin are mainly secreted by the fat tissues. Diet will produce a certain effect on leptin; moreover, too excessive fat content will lead to an increase of leptin in the plasma and a reduction of adiponectin [7, 8]. If the lipid content in the umbilical cord blood in the pregnant women is increased, the fat tissues in the fetus will be correspondingly increased, meanwhile, the fetal diet will also be affected. An effective reduction of adiponectin level has the maximum probability to predict the insulin resistance in the infants, while there is a certain relation of insulin sensitivity to the ratio of adiponectin / leptin [9]. In the study, a total of 120 pregnant women with gestational diabetes were given routine care. On the basis of routine care, the pregnant women in the treatment group were given blood sugar monitoring and diet control, and insulin treatment was provided if necessary. Then the insulin, umbilical blood sugar, and adiponectin levels in the three groups were detected [10]. The results showed that a relevant treatment on the patients can effectively control the changes of leptin, blood sugar, and adiponectin levels.

In conclusion, a correlated treatment on the pregnant women with gestational diabetes can effectively alter the leptin, blood sugar, and adiponectin levels, enhance the clinical efficacy, accelerate the rehabilitation, and deserve a wide recommendation in the clinic.

References