

The Effect and Clinical Analysis of Biochemical Test in The Diagnosis of Diabetes

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Abstract: To study the effect and clinical analysis of the application of chemical test in the diagnosis of diabetes. A total of 80 patients who came to a hospital for diabetes diagnosis from September 2020 to September 2021 were selected and randomly divided into experimental group and control group, with 40 cases in each group. The control group was given routine examination, and the experimental group was given biochemical test. The test results of the two groups were compared and analyzed. For patients requiring diabetes diagnosis, patients in the experimental group used a biochemical test, including fasting blood glucose, two-hours postprandial blood glucose, glucose tolerance, triglycerides, and hemoglobin. The accuracy of the test results in the experimental group was significantly higher than that of the control group, and the difference was statistically significant ($P < 0.05$). The application of biochemical tests in the diagnosis of diabetes can effectively provide doctors with diagnostic information, and the data is accurate, which is worthy of clinical promotion.

Key words: Biochemical testing; diabetes mellitus; diagnosis and treatment effect.

1. Introduction

Diabetes is a common clinical disease, and its incidence has been increasing year by year in recent years. With the changes in people's life, work, diet, etc., the number of people suffering from diabetes is increasing, and it is increasingly threatening people's life and health. Insufficient insulin secretion is one of the reasons. If it is not treated in time, it may cause long-term high blood sugar in the body, which will lead to metabolic dysfunction of the body, and finally cause damage to various tissues and organs of the body. Diabetes mellitus is a metabolic disease characterized by hyperglycemia, and its clinical symptoms include polyphagia, polyuria, polydipsia, and weight loss. For patients with this disease, the etiology is mainly genetic inheritance and environmental factors. At present, there is no specific drug for this disease, and hypoglycemic drugs are generally used, and long-term medication is required to control the development of the disease. If it is not treated in time for a long time, it will cause damage to the patient's cardiovascular, cerebrovascular, liver, kidney, etc., posing a threat to the life and health of the patient. In order to control the condition reasonably, diagnosis and treatment should be carried out as soon as possible. In the diagnosis of diabetes, blood sugar is generally checked, and there are many ways to check. Among them, biochemical detection is currently the most widely used method in clinical practice. It has high detection accuracy

and has great practical value in clinical practice. The purpose of this paper is to investigate the application of biochemical methods in the diagnosis of diabetes, and the report is as follows.

2. Materials and methods

2.1 Normal Information

A total of 80 patients who came to a hospital for diabetes diagnosis from September 2020 to September 2021 were selected and randomly divided into the experimental group and the control group, with 40 cases in each group. There were 21 males and 19 females in the experimental group, aged 35-76 years, with an average age of (55.5 ± 20.5) years. The control group consisted of 18 males and 22 females, aged 34-72 years, with an average age of (53 ± 16) years. There was no statistical significance in the general data comparison between the two groups ($P < 0.05$). Inclusion criteria: ① The patients had definite diabetes, and voluntarily participated in the trial and signed the informed consent; ② The ethics committee of a hospital approved the study. Exclusion conditions: ① The patient refused to sign to participate in the trial. ② Immune dysfunction or severe organic damage, unable to communicate normally; ③ Those with missing data or drop out ④ Patients with severe heart disease.

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2.2 Methods

Routine detection in the control group: 5ml of urine was taken from all the tested patients and placed in a urine analyzer for testing. Biochemical test of experimental group: First, subjects must undergo fasting blood glucose test, must fast for more than 8 hours before the test, and inform subjects that they can drink a small amount of water. Take 2ml of venous blood on an empty stomach in the morning to observe the fasting blood sugar. A fasting blood glucose value above 7 mmol/L is positive. Next, a glucose tolerance test (OGTT) is performed. Before the test, the subjects should be told to fast for 10-16 hours and start the experiment at 7-8 in the morning. Within 8 hours before the experiment, smoking, drinking and citing coffee are prohibited, but dry mouth can drink water in moderation to avoid mental stress and excessive physical strength activity, stop taking contraceptives, diuretics and hormones three days before the experiment. On the day of the experiment, take 300ml of sugar water containing 75g of anhydrous glucose, and measure 2ml of venous blood after 0.5 hours, 1.0 hours, 2.0 hours, and 3 hours, The 2-hour OGTT blood glucose that is greater than or equal to 11.1mmol/L can be diagnosed as diabetes. In addition, when checking blood lipid indicators, fasting for 12 hours is required, and venous blood is collected to check total cholesterol, LDL, HDL and triglycerides, of which total cholesterol is 3.0~5.2mmol/L, and low density lipoprotein cholesterol is 2.7~3.2mmol/L, HDL cholesterol 1.03~2.07 mmol/L, triglyceride 0.56~1.70mmol/L[1]. The above data are the data under normal circumstances.

2.3 Observation Indicators

The results obtained from the test are consistent with the results obtained at the time of clinical diagnosis.

2.4 Statistical Analysis

SPSS21.0 statistical software was used to process the statistical data, and the measurement data with normal distribution was expressed as standard deviation($\bar{x}\pm s$). Using t test, the measurement data that did not conform to the normal distribution were counted according to the normal distribution; Percentage calculation, using X2 test, $P < 0.05$ is a significant difference.

3. Results

3.1 Comparison of Two Groups of Detection and Diagnosis Efficiency

In the control group, 21 cases were effectively diagnosed, and the effective rate was 52%. 36 cases in the experimental group were effectively diagnosed, and the effective rate was 90%. See Table 1 for details

Table 1 Comparison of the effective rates of detection and diagnosis between the two groups [n (%)]

group	Number of examples	efficient	invalid	total efficiency
control group	40	21(52)	19(48)	21(52)
test group	40	36(90)	4(10)	36(90)
X ²	-	-	-	13.730
P	-	-	-	0.000

3.2 Comparison of Two Groups of Data Test Results

Comparing the test results of the two groups of data, the accuracy of fasting blood glucose, two-hour postprandial blood glucose, glucose tolerance, triglyceride, and glycosylated hemoglobin levels is higher than that of the control group. The details are shown in Table 2.

Table 2 Comparison of two groups of data test results($\bar{x}\pm s$, Points)

Group	Number of examples	fasting blood sugar	blood sugar two hours after meals	Glucose tolerance	triglycerides	Glycated hemoglobin level
control group	40	4.6±0.7	6.2±0.6	8.9±0.7	7.6±1.9	11.4±2.7
test group	40	8.7±2.3	12.1±2.5	14.5±3.9	15.4±2.9	16.3±3.8
X ²	-	10.785	14.267	8.938	13.681	6.480
P	-	0.001	0.001	0.002	0.001	0.001

4. Discussion

Diabetes is a common chronic metabolic disease. Due to its long course and many complications, there is no specific treatment for it. The current treatment method is to control blood sugar by taking hypoglycemic drugs. Diabetic patients should maintain long-term drug treatment to promote the stability of their blood sugar levels, which can reduce complications and improve the quality of life of patients. If you can't adjust your physical condition in time, it may cause damage to important organs and systems such as the nervous system, cardiovascular, eyes, kidneys, etc., and may also cause complications such as ketoacidosis, causing life-threatening. At present, studies have shown that early detection and rapid blood sugar regulation can help improve the prognosis of patients; reduce the survival pressure of patients and have a certain effect on improving the health status of patients. In the past, the clinical diagnosis of diabetes mostly used urine test. Although it has certain diagnostic significance, its detection rate is low, the operation is complicated, and it is difficult to meet the clinical diagnostic requirements. With the increasing popularity of biochemical detection technology in my country, some experts proposed that the method is easy to operate, fast in detection, and suitable for clinical application of diabetes [2-3].

Some scholars conducted biochemical tests on healthy people and diabetics, and found that there were statistically significant differences in fasting blood glucose, triglyceride, glucose tolerance, glycosylated hemoglobin and other indicators compared with the control group ($P < 0.05$). The results show that the method

has a high detection rate and high recognition ability for the diagnosis of diabetes patients. The results showed that the diagnostic efficiency of the biochemical examination group was 93.62%, which was higher than that of the routine examination group (65.96%), and the difference was statistically significant ($P < 0.05$). Biochemical tests only need to collect blood samples and put them in the biochemical analyzer, and the test results can be obtained quickly, which reduces the tedious steps of routine inspection and improves the detection rate. However, the results of biochemical tests are not normal, and it is uncertain whether it is diabetes or not, depending on the patient's condition. To avoid misdiagnosis, further comprehensive diagnosis is required.

Biochemical detection is a chemical detection method for qualitative and quantitative analysis of enzymes, proteins and their metabolites, and is a major clinical detection method. One of the most common methods is to detect enzyme deficiencies. Biochemical tests include liver function, kidney function, blood sugar, blood lipids, electrolytes, etc. The main tests are aspartate aminotransferase, alanine aminotransferase, alkaline phosphatase and other aminotransferases; glutamyl transferase, bilirubin, direct bilirubin, albumin, Prealbumin, etc. are all reflecting the function and reserve of the human liver. Kidney function includes sodium, potassium, magnesium, calcium, etc., which mainly reflect the kidney function of the human body. Blood lipids are mainly composed of high-density lipoprotein, low-density lipoprotein and cholesterol.

Since genes control the synthesis of enzymes and proteins, and then control a series of metabolic reactions, single-gene diseases caused by gene mutation will inevitably lead to abnormalities of enzymes and proteins. Therefore, by detecting these substances, it is possible to determine whether a specific gene is damaged or not, so as to make a corresponding diagnosis[4]. If it is a patient with phenylketonuria, it can be judged by detecting the level of phenylalanine in the plasma and the presence of phenylpyruvate in the urine. The diagnosis of albinism is based on a decrease in the activity of tyrosinase in the hair follicles[5].

At present, about 200 kinds of abnormal gene expression have been detected by electrophoresis, chromatography, immunization and other methods, which are detected by methods such as amino acid sequence determination. The main inspection objects are serum, living tissue (liver, kidney, skin); thyroid, intestinal mucosa, etc.) and the culture of fibroblasts.

With the advancement of medical science and technology, biochemical detection technology has been further improved, and the accuracy and convenience of detection have been further improved, gradually replacing conventional urine testing methods. A survey of satisfaction with daily physical examinations and biochemical tests for diabetic patients found that 92% of patients would use biochemical tests. Most patients believe that the test results can be obtained quickly by chemical methods, and the test data has high accuracy and certain economic benefits, so most patients can accept it. Biochemical tests include fasting blood glucose, serum

triglycerides, glucose tolerance, and glycosylated hemoglobin. Fasting blood glucose can determine blood sugar and glucose tolerance. The higher the blood sugar level in the patient's body, the greater the chance that the patient will be diagnosed with diabetes, and glycosylated hemoglobin is a comprehensive assessment of blood sugar in diabetic patients. Indicators that can assess a patient's blood sugar, and as triglycerides rise, so does the chance of developing diabetes. It can be seen that in the clinical diagnosis of diabetes, biochemical detection can be judged from multiple angles and has high diagnostic value [6].

At present, the incidence of diabetes in my country is increasing year by year, and the main causes of diabetes are genetic and environmental. Diabetes will have a great impact on the patient's body, and will have a serious impact on the cardiovascular, kidney, nervous system, etc., and even cause some organ failure. Diabetes is related to endocrine and metabolic disorders. The insulin level in diabetic patients is low, and the accumulation of glucose sugar is too much, which can easily lead to urine sugar and lead to the occurrence of diabetes. The clinical manifestations of diabetes are irritability, weight loss, polydipsia, polyphagia and polyuria. Diabetes is a disease that can easily cause complications such as urinary ketoacidosis, and requires timely treatment to relieve the condition and prevent the condition from worsening.

Measurement of Plasma Glucose: Detect the patient's plasma glucose, and judge whether the patient has hypoglycemia and hyperglycemia according to the patient's blood sugar level. When the glucose concentration in the blood exceeds 7.0 mmol/L, it is hyperglycemia. At this time, the blood osmotic pressure will continue to rise, and at the same time, the increase in the blood osmotic pressure of the patient will reduce the water content in the patient's body, which is also the main reason why diabetic patients often feel thirsty. The body of diabetics secretes very little insulin and cannot absorb glucose normally, which increases the protein consumption of the human body, so they are prone to the symptoms of weight loss and fatigue. If the patient's blood sugar is lower than 2.8 mmol/L, it is hypoglycemia, which is a typical clinical manifestation, manifested as confusion, lack of concentration, easy hunger, sweating, palpitations, weakness, etc. This is caused by the patient's nervous system disorder caused by the elevated blood sugar in the patient. If not dealt with in a timely and effective manner, the patient's life will be endangered. By measuring the blood sugar of the patient, the blood sugar status of the patient can be understood, and the patient with abnormal blood sugar level can be effectively treated, and the adverse reaction of the patient can be reduced.

Determination of serum triglycerides: Too high serum triglycerides can easily cause cardiovascular diseases, while the content of serum triglycerides mainly comes from chylomicrons and low-density lipoproteins, mainly through small intestinal mucosa, synthesized by the liver. Factors such as age and dietary habits are important factors leading to the synthesis of serum triglycerides in patients. To keep serum triglycerides in the normal range, it is necessary to develop good living habits. Results: The

plasma glucose and triglyceride of the 80 subjects were not within the normal range. Biochemical detection method has high accuracy in the detection of diabetes, and also has a certain guiding role in the clinical diagnosis of diabetes [7]. Based on the above, in the clinical examination of diabetes, both biochemical tests and routine tests have certain diagnostic value, but the diagnosis of biochemical tests is more convenient and effective, with higher diagnostic value, and has a high degree of agreement with the confirmed results, which can be widely used in clinical diabetes diagnosis. It has positive significance for improving the early detection rate of diabetes and improving the long-term prognosis of patients, and it is worthy of clinical promotion.

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