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Description and Treatment of Type One and Type Two Diabetes

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Abstract:

Diabetes is becoming more common as the population ages and people's quality of life improves. In diabetes mellitus, it is divided into T1D and T2D. Both types of diabetes have great harm to the human body and need to be treated and prevented in time. Two types of diabetes have been well understood in recent years. People can have effective treatment for T1D, so that T1D can be alleviated, and they can clearly know the symptoms of T1D and T2D. People have also discovered the causes of T2D and learned how to alleviate T2D. However, there are still a few things people don't know about T1D and T2D. As for the cause of T1D, researchers do not have a clear answer so far, most believe that T1D is a genetic disease. As for T2D, people have not yet found a way to cure it. This paper focuses on the etiology, symptoms, and growth of T1D and T2D in recent years. In addition, there is some introduction to the treatment of T1D and T2D. Although people's understanding of diabetes is much better than before, there are still problems such as the radical cure of T2D and the etiology of T1D that have not been solved, and it is hoped that these problems can be properly solved in future research.

Keywords: Type 1 diabetes (T1D); Type 2 diabetes (T2D); treatment; artificial pancreas.

1. Introduction

Diabetes is one of the most important diseases all over the world, and the number of diabetes patients is increasing continuously in recent years. There are two main types of diabetes, type 1 and type 2. In this article, both types of diabetes will be mentioned. The main characteristic of diabetes is chronic increase of blood glucose level, which is a metabolic disease group. In terms of the proportion of people with type 1 diabetes(T1D) versus type 2 diabetes(T2D), T1D accounts for only 5 to 10 percent, and T2D accounts for much more. [1] However, T1D continues to be the most common type of diabetes in children and adolescents, and T2D is becoming more common in younger adults [1]. Over the past few decades, the prevalence of T2D has increased substantially in most regions of the world. In the wake of population aging, the prevalence of diabetes among adults worldwide nearly doubled between 1980 and 2014, with the increase particularly pronounced among men in low - and middle-income countries. [2] The causes of type 1 and T2D are different, and the causes of T2D have been proven, such as improper diet, excessive obesity and lack of exercise. These factors can eventually lead to a loss of beta cell activity leading to T2D. The cause of T1D has not been proven yet. However, there have been some hypotheses about the etiology of T1D in the academic community, which have been widely supported. For example, some researchers believe that T1D is a genetic disease, in which the endocrine system of patients is disturbed, the beta cells of islets are seriously broken, and the insulin secretion is insufficient, and the blood sugar concentration cannot be adjusted in time, resulting in the rise of blood sugar and eventually diabetes. In this paper, both the symptoms and causes of T1D and T2D are mentioned. In addition, the treatment of both types of diabetes will be covered. Because of the improvement of people's living standard and material level, the number of diabetic patients continues to increase, people should start to pay attention to the treatment and prevention of diabetes, so as to avoid or treat diabetes. This article will summarize the two different ways of treating diabetes to help people with diabetes.

2. Risk Factors for Diabetes

Diabetes will not only lead to the rise of blood sugar, diabetes will also affect other indicators of the human body, such as blood pressure and serum uric acid may also play a role in diabetes complications [3]. These changes can lead to other conditions in people with diabetes, such as heart failure, cardiovascular disease and kidney disease. According to the study data, the decrease in blood pressure can lead to changes in systolic and diastolic blood pressure, which is conducive to the development of T2D heart failure. Regarding uric acid, high uric acid levels are

a risk factor for cardiovascular disease and kidney disease in people with diabetes. The Framingham Heart Study shows that various risk factors for serious cardiovascular complications can accumulate. In the same study, it is also clearly shown that diabetes can magnify the additive effect of risk factors in cardiovascular complications [4]. Therefore, if a person has diabetes, he needs to do not only to treat diabetes, but also to prevent the complications of diabetes, so as to ensure his physical health.

3. Descriptions of Type 1 Diabetes

3.1 The Causes of T1D

T1D is a heterogeneous disease characterized by the destruction of islet beta cells, which are the source of insulin production. The lack of beta cells in the islets eventually leads to a lack of insulin. There are also two types of T1D: Type 1a and Type 1b. The proportion of type 1a is greater than that of type 1b. Regarding type 1a, this is caused by autoimmune mediated destruction of beta cells. Type 1b is caused by idiopathic beta cell destruction or failure. However, T1D only accounts for 5 to 10 percent of the total diabetes category. However, in children and adolescents, T1D is the most common type of diabetes [1]. T1D is usually detected between the ages of 10 and 14 [5]. As for the cause of T1D, current researchers do not have an accurate answer, but the current prevailing paradigm believes that the cause of T1D is an environmentally induced autoimmune destruction of islet beta cells [1]. So the cause of T1D is different from T2D, it is more like a hereditary diabetes.

3.2 Symptoms of T1D

There are six main symptoms of T1D: diuresis, polydipsia, hyperphagia, weight loss, weakness and diminution of vision. Regarding Diuresis, high blood sugar is not conducive to the absorption of the kidneys, resulting in osmotic diuresis. Polydipsia is caused by hyperglycemia caused by the increased osmotic pressure of plasmids, excessive water loss, and eventually leading to intracellular dehydration. This stimulates the central nervous system, which causes thirst. In the process of rising blood sugar, more glucose will be excreted in the urine, so the energy in the body will be insufficient, and the human body will be in a state of semi-hunger, resulting in hyperphagia. Regrading weight loss, body take full advantage of energy, which produce by glucose. Protein and lipids can not fully decompose and energy in the body isoverconsumption. This then leads to a loss of body weight. T1D can also make the body weak, because the body's glucose is not used properly, and the body needs insufficient energy and nutrients. This leads to exhaustion and fatigue in the human body. In addition, high blood sugar can also lead to increased osmotic pressure of the lens, which affects the vision of the patient, so that their vision is reduced.

3.3 Worldwide Impact of T1D

Globally, the incidence and prevalence of T1D is increasing significantly. With regard to incidence, the overall incidence of T1D is increasing by about 2 to 3 percent per year. [1,6] The data [7] show that the greatest increase in the incidence of T1D is in children under 15 years of age, especially those under 5 years of age. In addition, the incidence of T1D is also affected by countries [5], and within countries, the incidence of T1D is also affected by different regions. In northern latitudes, people born in spring are more likely to have T1D than those born in other seasons. So far, the influence of T1D on people continues to rise. Although the cause of the occurrence of T1D is still unclear, it can be found from the above analysis that it has some relationship with genetics, so the country and the government need to make some examples for the prevention of T1D. For example, children between the ages of 5 and 15 should be tested regularly to identify T1D as early as possible, so that treatment can be started sooner and help stabilize the condition.

4. Descriptions of Type 2 Diabetes

4.1 The Causes of T2D

The cause of T2D is slightly different from T1D, but the basic cause is the same as T1D. The basic cause of T2D is a defect in the function of the beta cells of the pancreas, but a number of other factors can also contribute to T2D, such as the wrong diet, liver damage, insulin resistance, and lack of exercise. In addition, due to the complex etiology of T2D, patients who cannot be definitively diagnosed with other types of diabetes can be classified as T2D for the time being. In recent years, T2D has become more and more common among young people [1] In terms of unhealthy diet, eating too much food with high sugar content, such as delicate rice and noodles, can lead to T2D. When these foods are consumed, a large amount of glucose enters the body. When this glucose enters the body, the pancreas secretes insulin to control the amount of glucose in the body. But over time, this can lead to damage to the pancreas, which can affect the normal production of insulin. The thing about insulin resistance is that some cells are very insensitive to insulin. Insulin intake and blood sugar levels are high, but cells do not actively accept it, blood sugar can not be reduced. In addition, damage to the liver can also cause T2D. Damage to the liver can lead to severe glucose metabolism disorders. When blood sugar rises, the pancreas secretes insulin, which the

liver uses to circulate excess glucose out of the blood and convert this glucose into fat storage. But when the liver is damaged, its ability to recover is reduced and glucose in the blood cannot be reduced. Therefore, the current treatment of T2D is mostly based on insulin injection, but direct injection of insulin will have side effects, which will lead to hypoglycemia. So there are other ways that people might try to mitigate T2D.

4.2 Symptoms of T2D

Regarding the symptoms of T2D, it can be mild. It can take years to get noticed. [7] Some of the symptoms are similar to those of T1D, such as diuresis, polydipsia, and hyperphagia, and the causes of these three symptoms are the same in T2D, so there is no explanation for these three symptoms here. In addition, T2D has other symptoms, and wounds heal slowly. As for the slow healing of wounds, this is because the blood flow caused by high blood sugar is not smooth, so it will cause the healing speed of wounds. And T2D also affects the patient's immune system, making it significantly less immune, which can also affect wound healing. T2D can also cause concomitant symptoms such as fatigue and fatigue. The cardiovascular system is also affected by T2D which can lead to palpitations, shortness of breath and irregular heart rate.

4.3 Worldwide Impact of T2D

Although T2D is the largest form of diabetes in the world, the prevalence of T2D has increased significantly in most regions of the world over the past decade. This is mainly because of the ageing population. The global prevalence of diabetes among adults (85 to 95 percent) almost doubled between 1980 and 2014, driven by an aging population. The increase in diabetes is also slightly related to gender, with the increase more pronounced in low - and middle-income countries and among men than women. [8]

5. Treatments of Both Type 1 Diabete and Type 2 Diabetes

5.1 The Treatment of T1D

As for the treatment of T1D, this article mainly introduces two types: artificial pancreas and the use of reg protein to repair islet beta cells. However, the treatment method of reg protein repair islet beta cells is still in experiment and has not been formally used in clinical treatment.

5.1.1 Artificial Pancreas

Artificial pancreas therapy, also known as closed-loop blood sugar control, is an emerging treatment and a way to maintain target blood sugar that can alleviate some of the symptoms of diabetes. This method has been widely used in clinical treatment. Compared with insulin pumps, the artificial pancreas can automatically input insulin, which greatly reduces the burden on patients. [9] The artificial pancreas can automatically regulate the blood sugar of patients, reduce the time of hypoglycemia and hyperglycemia, and make the blood sugar of patients close to the normal blood sugar range. [9] However, as an emerging treatment, artificial pancreas still has some shortcomings. Because the artificial pancreas needs to be continuously connected to the body's circulatory system, this increases the risk of infection. On the other hand, the artificial pancreas is not very good at adjusting the blood glucose of patients after meals, and sometimes patients need to manually adjust the blood glucose concentration.

5.1.2 Repair Islet Beta Cells Using Reg Proteins

At present, this method is still in the experimental stage, and has not been used in clinical treatment. reg protein can be used to repair islet beta cells by stimulating them and causing them to undergo mitosis, thereby increasing the number of islet beta cells. The islet beta cell is a cell that can secrete insulin, but its lifespan is limited, so there is a shortage of islet beta cells. The blood sugar situation cannot be regulated. Culture of the reg protein is also an important part of the treatment. Enzymes can be used to extract a gene from the reg protein, and then ligase the gene to the plasmid, such as pGBKT7 (which is a yeast expression plasmid). After linking the plasmid to the target gene, the plasmid can be put into yeast for replication. Because yeast reproduces very quickly. After the protein expression is completed, the protein can be extracted and purified to obtain the desired protein and used to treat T1D.

5.2 The Treatment of T2D

5.3.1 Injection drugs

Medication, such as melbine, is the most common form of treatment. The drug reduces glucose production in the liver and increases the body's sensitivity to insulin, allowing the body to use insulin more efficiently. In addition, patients can also treat T2D by directly injecting insulin. But direct injections can have side effects such as low blood sugar.

5.3.2 A healthy diet

One of the causes of T2D is an unhealthy diet. Patients eat too much food with high sugar content which leads to T2D. Therefore, reducing sugar intake is also a way to control and alleviate T2D. Patients with T2D can reduce the intake of sugar by reducing the staple food, which will reduce the blood sugar concentration of patients. Patients can eat more vegetables, meat and fruits with low sugar concentration. But try to avoid or reduce the intake of in-

dustrial saccharin.

5.3.3 Appropriate exercise

Increasing exercise and physical activity can promote the body's energy consumption and metabolism, thereby improving the efficiency of insulin utilization and helping to lower blood sugar levels. In addition, proper exercise can also reduce the patient's weight, which can also significantly improve insulin sensitivity, reduce insulin resistance, and thus improve blood sugar control.

6. Conclusion

This article, explain the differences between T1D and T2D, as well as the causes and symptoms of each. In addition, the treatment of T1D and T2D is also introduced. In today's society, due to the improvement of people's quality of life, the number of diabetes patients continues to increase, so people need to have a general understanding of diabetes, understand its causes and symptoms after the onset, and carry out targeted treatment and prevention, so as to reduce the incidence of diabetes and make themselves healthy. In this article, the treatment of diabetes is listed, hoping to have some help for patients with diabetes, but also hope to alert people who have not yet suffered from diabetes, so that they even protect, so as to avoid contracting diabetes. However, there are some methods that are not mentioned in this article, so the help that can be given to patients is limited. In addition, regarding diabetes and other treatments, this is still an area that researchers need to continue to study, hoping that in the future, reg proteins can be used in clinical treatment of T1D, and T2D can be cured.

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