

Diet and Type 2 Diabetes: Research Advances and Therapeutic Applications

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Abstract. Type 2 diabetes (T2D) is mainly caused by the inability of cells in the body to absorb enough sugar, causing the pancreas to be unable to keep blood sugar levels within normal ranges. T2D is a disease that occurs when blood sugar is too high. The main source of blood sugar is food. T2D is usually not cured, only alleviated. Research now suggests that T2D is associated with many diseases. T2D is also the most common form of diabetes in the world. This paper analyzes the relationship between diet and diabetes mellitus and its application in the treatment of the research, and has obtained effective results. It is hoped that for T2D patients, the ideal diet for diabetes patients can be studied without affecting their condition, and relevant consensus can be reached. It provides an effective reference for future research, and there are still many deep problems that cannot be solved. Future research can focus on the direction of the relationship between diet content and diabetes.

Keywords: T2D; diet; applications.

1. Introduction

T2D is mainly the result of two problems: Cells in muscle, fat and the liver become resistant to insulin. As a result, the cells don't take in enough sugar. The pancreas can't make enough insulin to keep blood sugar levels within a healthy range. T2D is a common condition that causes the level of sugar (glucose) in the blood to become too high. It can cause symptoms like excessive thirst, needing to pee a lot and tiredness. It can also increase the risk of getting serious problems with eyes, heart and nerves. Over time, diabetes can damage blood vessels in the heart, eyes, kidneys and nerves. People with diabetes are at higher risk of health problems such as heart attack, stroke and kidney failure. Diabetes can damage blood vessels in the eye, leading to permanent vision loss [1]. T2D, which used to be called adult diabetes, is more common in older people, and this type of diabetes cannot be completely cured. The disease can only be controlled by the patient's own weight loss, controlled diet and exercise, and if this is not effective, diabetes drugs and insulin may be recommended to treat it. The American Diabetes Association classifies T2D as the most common form of diabetes. Its incidence increases with age. High blood sugar in T2D is caused by a lack of insulin. It is also a heterogeneous disease. T2D is one of the most common endocrine diseases, which seriously affects the health insurance sector and the economy [2]. The significance of studying T2D is to achieve prevention, treatment and cure of this disease and its complications. The National Institutes of Health strongly supports research that focuses on all stages of the disease [3]. T2D has been linked to a number of conditions, such as gestational diabetes, Alzheimer's disease, and even being a risk factor for the onset of depression [4]. In related studies, depressive symptoms and major depression are twice as prevalent in people with T2D as in those without T2D, and depression is associated with an increased risk of diabetes [5]. Gestational diabetes is a carbohydrate intolerance that begins or is first identified during pregnancy, and through studies, women with a history of gestational diabetes have a nearly ten-fold higher risk of developing T2D than women with normal blood sugar pregnancies. Diabetes is often associated with obesity, and in the case of T2D, studies have identified at least 150 DNA mutations associated with the risk of developing T2D [6].

This paper analyzes the relationship between diet and diabetes complications and its application in treatment from the perspective of research, aiming to find out the relationship between diet and diabetes and provide effective reference for future research.

2. The pathogenesis of T2D

According to long-term research, T2D mellitus is a chronic metabolic disease, mostly caused by genetic, environmental and other factors, high glucose toxicity, insulin resistance, glucose and lipid metabolism disorders, and other comprehensive harm to the human body chronic metabolic disease [7]. T2D mellitus in the world belongs to the high hair disease, the incidence of the population age range, in youth, middle age, old age have a very high likelihood of disease, as of the end of 2021, the world has 537 million adult patients with diabetes mellitus, and gradually tends to the younger age group [8].

Research on the causes of the disease, first of all, T2D is different from type 1 diabetes, type 1 diabetes autoimmune system attack caused by insufficient insulin secretion, while T2D is mostly due to insulin resistance and pancreatic islets have a loss of function caused by some of the T2D has a genetic factor, but not completely hereditary, and today's experimental results are known to be changes in genes will lead to the proteins affected by the protein changes, which can cause insulin resistance. alterations that can cause insulin resistance and insufficient insulin secretion [8]. Secondly, environmental and lifestyle factors also have a great impact on the development of diabetes, in dietary habits, accustomed to consuming high sugar, high salt, high oil food, which has an impact on the cause of T2D, poor dietary habits will lead to the human body's blood glucose rises, more than the standard value of the human body is difficult to metabolize, resulting in insulin levels cannot withstand. For example, the high incidence of diabetes in the Shandong region of China is related to the regional dietary habits, due to the Shandong region more noodles, barbecue, etc., which can easily lead to excessive intake of carbohydrates, sugar, salt, oil, etc., resulting in a high incidence of diabetes. Similarly, the development of science and technology, leading to a change in the contemporary office, accompanied by sedentary, lack of exercise, obesity and other problems, also contributes to the factors of genetic disease [7].

3. Complications of T2D

T2D is a chronic metabolic disease with a variety of complications, complications are usually divided into chronic complications and acute complications, of which the acute complication is diabetic ketoacidosis, this complication is due to the body's insulin being seriously lower than the normal level, in addition to the possibility of leading to hyperglycemia hypertonicity, this complication is manifested in the rapid rise in blood glucose, which can lead to cerebral thrombosis, resulting in patient death, and the complication of lactic acidosis, which can lead to the development of the disease, the patient's blood glucose level. Death, there are also complications lactic acidosis, which is a serious metabolic disorder disease, diabetes causes the body cannot be very effective in the use of glucose, so it will lead to diabetic patients with medication this complication, serious patients may die of shock. Chronic complications commonly include cardiovascular diseases (CVDs), such as coronary heart disease and myocardial infarction, as well as neuropathy, such as autonomic neuropathy, including renal diseases, such as renal failure, such as skin infections such as septic infections, as well as oral diseases, gastrointestinal diseases and so on. However, with the change in lifestyle, in recent years, T2D mellitus patients are more likely to experience the complications of depression and anxiety, according to the study, T2D mellitus patients suffering from anxiety and depression is an important risk factor related to the duration of T2DM [9]. In the statistics, it was found that the plateau environment, the proportion of people with diabetes 4.6% of some special environments can also lead to physiological changes in the human body, the study of different drugs is very important, among them, for the treatment of T2D metformin, in the plateau hypoxic

environment, may cause metformin accumulation, which leads to kidney injury, therefore, more research is needed for the treatment of T2D program [10].

A diet high in sugar can be harmful to T2D in a number of ways. First of all, if the diet contains too much sugar, it will lead to an increase in blood glucose levels, which will be too high for a long time and will, to a large extent, increase the likelihood of suffering from diabetes mellitus [5]. The control of the intake of sugar needs to increase the intake of dietary fiber. Dietary fiber belongs to the food in the sugar cannot be digested and absorbed by the human body, the composition contains oligosaccharides, cellulose, hemicellulose, etc., can play the role of satiety, lowering blood glucose, blood lipids, so it can prevent diabetes and its complications, CVD, gastrointestinal diseases, and so on. Secondly, high oil diet also has an impact on causing diabetes, when the body consumes too much oil will lead to fat accumulation, obesity is an important influence on diabetes. Fat cells secrete hormones and growth factors that affect insulin secretion and action, leading to diabetes. Therefore, the choice of healthy fats, controlling the intake of calories and carbohydrates, increase the amount of exercise, for the control of diabetes has an important impact and significance, to maintain the stability of blood glucose, for diabetes has an important impact, suffering from diabetes population is currently difficult to completely cure, most of them through metformin hydrochloride and other drugs to control. There is a close relationship between fatty acids and diabetes, according to research findings, a diet high in fatty acids can lead to abnormal lipid metabolism, and an increase in the proportion of saturated fatty acids or polyunsaturated fatty acids in the diet can cause more serious insulin resistance than monounsaturated fatty acids. And different fatty acids have different effects on glucose metabolic clearance, which will affect the body's glucose tolerance, which also has a serious impact on health [6].

4. Prevention of T2D

4.1. Diet Patterns

To prevent T2D away from normal life, the most important thing is to keep a healthy and regular eating habit. Do not overeat in normal life, eat less foods high in sugar and salt, such as fried foods. Eating more vegetables could promote satiety, and decrease the amount of staple food intake, which is much healthier than just eating staple foods and meats. Eating meat is also important to diabetics because they still need enough protein intake. In the recipe for diabetes, fibre in the food is more important than the amount of sugar. Because fibre will take more time for the human body digestive it, this may increase the time of satiety. By using the correct diet plan, diabetics could keep their satiety with low intake of sugar, thus lowering blood sugar. Some of the diet plan also suggest diabetics to drink soup after eating. Because soup could help diabetics absorb nutrients, such as various trace elements, and won't absorb too much sugar at the same time. But these diet plans also point out that soup must be drunk after main course, because soup will present a high satiety, this satiety will disappear in a very short time and may cause diabetics to intake more sugar. At last, all of the diet plans emphasize that food must be light and less sugar. Otherwise, the kidneys and heart of diabetics will deal with too much stress and may cause kidney disease and heart disease.

4.2. Application of Drugs

Diabetics still need some drugs, such as insulin, anti hypertensive drugs and hypoglycemic drugs. Hypertension usually appears with diabetes II, hypertension may cause the blood vessels to break, especially after having meal. Because human body needs to transport insulin to the target organ as fast as possible, this needs a higher blood flow rate. Eating insulin could increase the concentration of insulin in blood, this could increase the efficiency of decreasing blood sugar concentration. Restore blood sugar concentration to standard value. Hypoglycemic drugs are also useful for diabetics, because long-term intake of insulin may also lead to nonalcoholic fatty liver disease, this is mainly caused by glycototoxicity caused by hyperglycemia causes liver cell lesions. And the lesions of liver cells will further deepening of diabetes. Eventually, both diseases become incurable [11].

5. Conclusion

In conclusion, when a person had got diabetes II because of overeating and unhealthy diet, he will also need to face wide variety of complications, such as hypertension and all kinds of CVDs. If the diabetics have ingesting too much medication, may also cause nonalcoholic fatty liver disease and kidney disease. Diabetes can easily be a trigger for fatal diseases, such as CVD, this caused diabetics must always keep an eye on their blood pressure, blood sugar, and lipids. Otherwise the complications of accumulation will destroy patient's body with diabetes. T2D affects a significant number of people in the world, and many countries, including China and the United States, are affected by it, and most of them stem from unhealthy dietary habit and overeat. T2D is also attracting considerable attention worldwide, and more and more drugs for the treatment of diabetes and its complications are being developed and promoted to the public. It is foreseeable that in the future, more people will get rid of diabetes and regain a healthy body.

Authors Contribution

All the authors contributed equally and their names were listed in alphabetical order.

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