Review

Diabetes Mellitus: A review

Mohammed Talat Abbas[1]

Ali J. Ali[2]

Noor Hadi[2]

1. **Department of Pharmaceutical Chemistry, College of Pharmacy, University of Karbala, Iraq**
2. **Department of Clinical Laboratory Sciences ,College of Pharmacy, University of Karbala, Iraq.**

Abstract:

Diabetes is one of the most important disorders of metabolic and chronic diseases affecting small and large ages, which result from lack of insulin production of beta cells present in the pancreas of Lancherhans in the pancreas or result from the inability of human cells to respond to insulin, which leads to a rise in the blood glucose levels . There are two main types of diabetes: the first type (the type I) that is produced when the human body is unable to produce insulin due to a defect in the work of the immune system, where the immune cells attack the cells producing insulin (beta cells) in the pancreas, while type (II) The most common result is the inability of the body's cells to respond to insulin, despite the efficiency and ability of the pancreas to produce insulin, due to an unknown reason .

Keywors: Diabetes Mellitus, type 1,type2.

الخلاصة:

مرض السكري

مرض السكري تعتبر احد اهم اضطرابات الامراض الايضية والمزمنة التي تصاب بها الاعمار الصغيرة والكبيرة والتي تحدث نتيجة نقص في انتاج الانسولين من خلايا بيتا الموجودة والواقعة في جزيرات لانكرهانز في البنكرياس او تحدث نتيجة عدم قدرة خلايا الانسان على الاستجابة للانسولين والتي تودي الى الارتفاع الكبير في مستوى السكر في الدم عن المستويات الطبيعية.يوجد نوعان اساسيان من مرض السكري: مرض السكري من النوع الاول يحدث عندما يحصل خلل في وظيفة الجهاز المناعي للانسان وبهذه الحالة تكون جسم الشخص غير قادر نهائيا على انتاج الانسولين نتيجة مهاجمة الخلايا المنتجة لجزيئة الانسولين في البنكرياس من قبل الخلايا المناعية، في حين ان النوع الثاني من مرض السكري والذي يعتبر اكثر شيوعا من النوع الاول يحدث نتيجة عدم قدرة خلايا الانسان على الاستجابة للانسولين اي يوجد انتاج للانسولين من قبل البنكرياس لكن خلايا الجسم لا تستطيع الاستجابة له لاسباب غير معروفة.

Introduction:

Is one of the most serious metabolic diseases that affect the human, which is characterized by a high level of blood glucose from the normal level, which occurs as a result of the decline in the level of insulin produced by the pancreas or occur due to sensitivity of insulin to the tissues or both. The lack of control of the level of sugar in the blood may lead to many complications and dangerous, including early death and blindness and amputation of the leg [1] .People with diabetes have problems converting food into metabolism. After a meal, carbohydrates break down into glucose , which is transported to all cells of the body to make use of it and produce energy.[2] Most cells in the body need insulin to allow glucose to enter the blood and the medium between the cells and into the cells; if eating a diet rich in sugar and starches large, the liver and the pancreas are unable to produce enough insulin to enter sugar into cells, and remains part of sugar in the blood; Second mode diabetes results in the non-conversion of glucose into energy, resulting in excessive amounts of sugar in the blood, while cells remain energy-hungry.[1]

The symptoms of the diabetes mellitus are an elevate in urine urination due to increased osmotic pressure, increased thirst sensation, increased fluid intake to try to compensate for increased urination, severe and general fatigue, decrease in weight although eating food freguently, polyphagia, poor healing of wounds, these signs are less severe if the blood glucose concentration is slight, there is a direct correlation between these signs and plasma sugar. Blood sugar can be reduced by reducing the intake of soft drinks and processed juices, and reducing the intake of complex

carbohydrates such as pastries, pancakes and candies; and movement (such as walking and sports) helps to consume blood sugar.[3] Diabetes is threatening everyone from small to large to the elderly, as this disease is not related to age as some people think, but it has to do with the genes and the body's internal structures.[4]

A person with diabetes needs to be reviewed by a specialist doctor. No doctor can prescribe diabetes without knowledge. Diabetes is one of the most serious diseases that people experience today.[5] The doctor is well aware of the situation and the person in front of him, and is aware of sufficient information relating to the state of illness in front of him, diabetes is treated based on the reasons that led to injury. Today's diabetic patient is better off than diabetics yesterday, as the development of the modern technology world has led to easy handling of the disease and has led to the availability of easy things for treatment .[6] Studies have also confirmed that diabetes is a disease that never has a cure, and that it remains in the patient for the rest of his life, so the patient gets only some of the things that regulate the disease, but can never be cured. Some people believe that sugar-rich foods are the cause of diabetes, but the fact is that many of that cause diabetes, including the secretion of growth hormone in an excessive way, the psychological and emotional factors experienced by the body, which cause the case of disease, anxiety and fear also cause these things.[7]

The WHO divides disease into 3 types: diabetes mellitus type 1, diabetes type 2 and gestational diabetes; and each pattern has its own causes and spread in the world. All types of diabetes are similar to the fact that insulin is not produced by the pancreas, but the causes for their inability to do so vary according to the pattern. The inability of beta cells to secrete enough insulin in the first pattern is due to destruction (These are not responsive to the insulin effect, which leads to the need for high amounts above the normal level of insulin. Gestational diabetes is similar to the second type, because it also involves insulin resistance because the hormones that are released during pregnancy can cause insulin resistance in genetically qualified women.[8]

Diabetes Type I:

The first type of diabetes is characterized by the inability of beta cells in the pancreatic Lankerhans cells to produce insulin because of the crash and the cause of the crash because of the autoimmune, which attacks the beta cells responsible for producing insulin. This type of diabetes accounts for about ten percent of diabetes Which affects people in the world and there is no way to prevent this disease, which affects children mainly and affects children with large weights.[9]

The first pattern mainly deals - even through the first stage - with insulin injections with monitoring the levels of blood glucose . A patient who does not take insulin can develop diabetic ketoacidosis, which leads to coma or death. The patient should be stressed to adjust his lifestyle, especially with regard to strength and exercise; although this cannot compensate for the loss of betacells. Apart from the conventional use of insulin injections under the skin, insulin can be delivered to blood via a pump - which can leak insulin throughout the day at certain levels - and doses (such as large doses) can be controlled - as needed - at meal times. There was also an inhalable insulin called Exubera, adopted by the US Food and Drug. [10]

Diabetes Type II:

The second type of diabetes is different from diabetes type I where there is resistance against insulin in addition to the lack of beta cells in the production of insulin and that the receptors of insulin in the cellular membranes of the body tissues do not respond appropriately to insulin. In the early stages of the disease note the high level Insulin in the blood and non-response of cells tissues of insulin, but over time we notice a decrease in the level of insulin and the body of the patient needs insulin. It is possible to reduce the blood glucose level by some types of drugs, which increase the effectiveness of insulin and Night of

glucose production of the liver.[9]

There are many studies and theories that work to determine and work out the cause of the state of diabetes type II. It is clear that known obesity or excess rashes, or what is known as fat that is centered around the abdomen and not fat that is found under the skin leads to insulin The fat in the abdominal limb activates the fatty hormones and secrete a group of hormones that reduce the efficacy of insulin in patients with type II diabetes and

who suffer from sepsis.[10]

The second pattern can continue without patient observation for a long time because of the weakness of the symptoms or because of their lack of clarity or as mere transient individual cases that do not suggest disease. The patient does not usually suffer from ketosis, but can produce serious complications of non-observation of the disease such as kidney failure caused by diabetic nephropathy or vascular disease, such as coronary disease, eye disease caused by diabetic retinopethy, or loss of pain sensation Due to diabetic neuropethy, or hepatic damage caused by non-alcoholic hepatic hepatitis, that is, not alcohol drinks, as is usually the case.[11]

The treatment of the second type usually begins by increasing physical activity and reducing the intake of carbohydrates, in particular reducing the drinking of sugary drinks and reduce the eating of sweets, and reduce weight.[12]

Signs and symptoms

One of the most important traditional symptoms of people with diabetes is increased urination, frequent thirst and increased sense of hunger. It is likely to develop symptoms of the disease very quickly in weeks or months, especially in the first type when patient is a child. On the contrary, the development of symptoms of the disease type It is possible that the first type of diabetes causes a rapid loss of weight and it is also possible to feel the patient's fatigue and persistent fatigue and all these symptoms mentioned occur in the second type of disease .[13]

When the concentration of blood glucose is higher than the maximum kidney capacity, glucose re-absorption is not completed in the corneal tube and remains

part of the sugar in urine and increases the reabsorption of kidney to the water which leads to increased urine production and thus loss of body fluids [14].

Prolonged glucose concentration causes glucose uptake, leading to disturbance in the lenses in the eye, leading in disorders in vision. Diabetics generally complain of a distorted vision and can be diagnosed. It should always be assumed that the patient has type 1 diabetes in cases of rapid vision change while the second type is typically gradual in its speed, but it should also be assumed to be infected.[15]

Diabetics (usually type 1 patients) suffer from ketone acidity, a condition that is degraded due to irregular metabolism characterized by the presence of acetone odor in the same patient, rapid and deep breathing, increased urination, nausea, vomiting and colic as well as a variable case of loss awareness or arousal such as aggressive or insanity can be the opposite, no disorder and lethargy. When the condition is severe, followed by coma leading to death. Therefore, ketone acidosis is a serious medical condition that requires sending the patient to the hospital.[16]

Another case, called leukocyte, is a rare condition but at the same risk as ketone. It is more common for type 2 patients and its main cause is dryness due to loss of body water. It occurs when the patient drinks large amounts of sugary drinks, resulting in the loss of large amounts of water.[17]

Prevention of Diabetes:

1. Avoid eat high-carbohydrate foods such as eggs, rice and macaroni. Instead,foods rich in fiber, such as oats and grains, are recommended.
2. The person with diabetes should avoid smoking because it increases the risk of the disease because of its direct effect on the heart and blood vessels.
3. Work on weight loss, avoid obesity and work on weight loss. This promotes blood flow throughout the body and promotes metabolism and works to lower .blood sugar.
4. Do not eat a diet that contains high amounts of sugars but work to eat high amounts of fruit. [18]

Diabetes and Infections

High blood sugar from diabetes can affect the body's immune system, impairing the ability of white blood cells to come to the site of an infection, stay in the infected area, and kill microorganisms. Because of the buildup of plaque in blood vessels associated with

diabetes, areas of infection may receive a poor blood supply, further lowering the body's ability to fight infections and heal wounds.

Common infections

People with high blood sugar from diabetes can be more severely affected by common infections, such as influenza and pneumonia caused by Streptococcus pneumoniae. This is why immunizations for influenza (the flu) and pneumococcal disease are recommended for people who have diabetes.

And people who have high blood sugar from diabetes are more likely to be infected with unusual organisms, such as Gram-negative bacteria or fungi.

Foot infections

Foot infections are common in people who have high blood sugar from diabetes. Nerve damage (neuropathy) combined with poor blood supply to the feet puts people who have high blood sugar from diabetes at high risk for infected foot ulcers.

Complications of diabetes.

.1Low blood glucose:

Low blood sugar is caused by the use of many anti-diabetic drugs. This decrease may occur when the patient does not take sufficient amounts of glucose. This condition becomes mild and causes sweating, as well as the appearance of symptoms of the nervous system. And sometimes lead to loss of consciousness and coma and death due to the destruction of the brain. In addition, there are many reasons that lead to a decline in the level of sugar in diabetes, including excessive intake of insulin or the use of inappropriate dose, and in the sale Sometimes the decline occurs as a result of exercise excessively and hard.

The weak response of the thyroid gland to the hypothyroidism can lead to a loss of awareness of the body's low blood sugar. Low blood glucose associated with autonomic nervous system failure means that reductions in blood glucose cause both impaired blood glucose recovery and lack of awareness of low blood glucose. In many cases, avoiding short-term hypoglycemia can restore the body's awareness of low blood glucose levels in most patients, but this is theoretically more than in practice.[19]

Acute complications Diabetic ketone acidity:

Diabetic ketone acidity is an urgent, acute and serious complication. Insulin deficiency leads that the liver converting fat into ketone bodies which the brain uses as fuel. However, high levels of ketones cause a decrease in blood pH, causing most of the symptoms of ketone acidity to occur. When the patient is admitted to the hospital, the

symptoms usually are dry and deep breathing. Appropriate treatment leads to the full return of the normal state, but the patient can die if he does not receive adequate treatment as soon as possible to avoid complications.[20]

Asymptomatic coma no ketonic pressure:

The state of coma is a severe double-edged combination accompanied by many symptoms of ketone acidosis, but due to a completely different treatment. This situation is urgent, especially production of drought through the replacement of lost fluids. And it can develop lethargy into a zombie, which is common in the second type of diabetes more than the first pattern. [21]

Gestational Diabetes:

Gestational diabetes is another type of diabetes that affects pregnant women, which is characterized by high blood sugar, due t several causes for example the obesity and genetic factor ,as well as increasing the weight of pregnant women during the first months of pregnancy. **[22-26]**

Factors that help to induce gestational diabetes:

Factors to help with gestational diabetes is weight gain before pregnancy. The presence of sugar in the urine. Weak glucose tolerance. Having a family history of diabetes such as a father, mother, or sibling. If the woman has given birth to a child weighing more than 4-5 kg before. If a woman gave birth to a dead child before. If Mrs. Biscari has been pregnant before. If the perineal fluids are greater than normal.[27]

Symptoms of gestational diabetes:

Most women do not experience any symptoms of gestational diabetes, but some may experience some of the following symptoms in the last months of pregnancy: feeling thirsty. Increase the number of times a bathroom goes. Weight loss despite eating. Hair fatigue and nausea. Frequent exhaustion. Frequent inflammation of the urethra, vagina, or skin infections. Blurred vision.[28]

Diagnosis of gestational diabetes:

Examination of the fetus using ultrasound to ascertain its weight, fluid surrounding it, and conduct a chart of its pulse. Check your blood sugar level four times a day before each meal, and then two hours to control the level of sugar in the blood. Blood test, to determine the sugar, where it must not exceed 140 mg / dL, and the most accurate sugar test after fasting eight hours.[29]

Treatment and prevention of gestational diabetes:

Exercise a daily basis, such as swimming, yoga and walking for half an hour. Avoid eating fruits and vegetables rich in sugar. Eat small meals every two hours. Avoid sugary drinks. Avoid too many salty or canned foods. A healthy diet contains grains, vegetables, fruits, low calories, and carbohydrates. Take your medicine based on your doctor's advice. Avoid eating sweets. Avoid smoking. Control weight, prevent its increase. Eat a few biscuits, or salted cakes, if you feel nausea or dizziness. Eat foods high in fiber, such as rice, vegetables, and fruits, where pregnant women need 35 g fiber a day. Eat enough water, equivalent to eight cups a day.[30]

Conclusions:

Through this research we concluded that diabetes of all kinds is considered a serious metabolic disease, which affects many people in the world, which leads to the death of many of those infected with it and the most important complications of the disease is fainting, blindness and amputation of leg, as well as angina, and we concluded that the exercises Sports and lifestyle changes and different foods have an important role to prevent this disease.

References:

1. "Diagnosis of Diabetes and Prediabetes". National Institute of Diabetes and Digestive andKidney Diseases. June 2014. Retrieved 10 February 2016.

2. Kitabchi, AE; Umpierrez, GE; Miles, JM; Fisher, JN . "Hyperglycemic crises in adult patientswith diabetes.". Diabetes Care 2009.32 (7): 1335–43 .

3. Shoback, edited by David G. Gardner, Dolores . Greenspan's basic & clinical endocrinology(9th ed.). New York: McGraw-Hill Medical. pp. 17. 2011,0-07-162243-8.

4. Wood ZA, Schröder E, Robin Harris J, Poole LB . "Structure, mechanism and

regulation ofperoxiredoxins". Trends in Biochemical Sciences 2003,28 (1): 32–40.

5. Stolar MW, Hoogwerf BJ, Gorshow SM, Boyle PJ, Wales DO.Managing type 2 diabetes: goingbeyond glycemic control. J Manag Care Pharm 2008;14:2-19.

6. Kruger DF, Lorenzi GM, Dokken BB, Sadler CE, Mann K, Valentine V. Managing diabetes with integrated teams: maximizing your efforts with limited time. Postgrad Med .2012;124:64-76.

7. Rees DA, Alcolado JC. Animal models of diabetes mellitus. Diabet Med 2005;22:359-70.

8. Chatzigeorgiou A, Halapas A, Kalafatakis K, Kamper E. The use of animal models in thestudy of diabetes mellitus. In Vivo 2009;23:245-58

9. Anonymous. Diagnosis and Classification of Diabetes Mellitus – Position Statement.2004

10. Barcelo A, Aedo C, Rajpathak S and Robles S. The cost of diabetes in Latin America and theCaribbean. Bulletin of the World Health Organization, 2003,81(1):19-27.

11. Belinda R. Gale Encyclopaedia of Alternative Medicine. 2004, 2603-2605.

12. Cahill GF Jr and Boston MD. Physiology of insulin in man. Diabetes,1971, 20(12):785-799.

13. Collins FM. Current treatment approaches to type 2 diabetes mellitus successes andshortcomings. American Journal of Managed Care, 8(16 suppl):S 2002,460-S471.

14. Consoli A. Role of liver in pathophysiology of NIDDM. Diabetes Care,1992, 15(3):430-41.

15. Curtis LT. New technologies and therapies in the management of diabetes. American journalof managed care, 13(2 suppl): S 2007,47-S54

16. Hart WM, Espinosa C and Rovira J. Cost of unknown diabetes mellitus in Spain. Med Clin(Barcelona), 1997,109:289- 293.

17. Himsworth HP. Diabetes mellitus: its differentiation into insulin-sensitive and insulin-insensitive types. Lancet,1936 227(5864):127-130.

18. Hoppener JW and Lips CJ. Role of islet amyloid in type 2 diabetes mellitus. Int J BiochemCell Biol,2006. 38(5- 6):726-36.

19. Inzucchi SE. Oral antihyperglycemic therapy for type 2 diabetes: scientific review. JAMA,2002, 287(3):360-372.

20. John . Treatment of Diabetes Mellitus with Herbs. Annual Review of Pharmacology,1998,13: 35-43.

21. Kahn SE and Porte DJr. Islet dysfunction in noninsulin-dependent diabetes mellitus. AM JMed1988, 85 (5A): 4-8

22. Kirigia JM, Sambo HB, Sambo LG and Barry SP. Economic burden of diabetes mellitus inthe WHO African region. BMC International Health and Human Rights,2009 9:6.

23. Expert Committee on the Diagnosis and Classification of Diabetes Mellitus. Report of the expert committee on the diagnosis and classifi cation of Diabetes Mellitus. Diabetes Care 1997;20: 1183-97.

24. Beverley B, Eschwège E. The diagnosis and classification of diabetes and impaired glucosetolerance. In: Textbook of Diabetes 1 Ed: John C Pickup and Gareth Williams Third edition; Chapter 2. 2003; pp. 2.1-2.

25. Lindberg G, Lindblad U, Melander A. Sulfonylureas for treating type II diabetes mellitus.Cochrane Database Systemic Reviews. 2004; 3.

26. Bearse MA J et al., Local multifocal oscillatory potential abnormalities in diabetes and earlydiabetic retinopathy. Invest Ophthal Vis Sci. 2004; 45: 3259-65.

27. Hove MN, Kristensen JK, Lauritzen T, Bek T, the prevalence of retinopathy in an unselectedpopulation of type II diabetes patients from Arhus County, Denmark. Acta Ophthalmol Scand. 2004; 82: 443-48.

28. Seki M et al., Involvement of brain-derived neurotrophic factor in early retinal neuropathy of streptozotocin-induced diabetes in rats: therapeutic potential of brain-derived neurotrophic factorsfor dopaminergic amacrine cells. Diabetes 2004; 53: 2412-19.

29. Moran A et al., Cardiovascular autonomic neuropathy is associated with micro albuminuria inolder patients with type II diabetes. Diabetes care 2004; 27: 972-77.

30. Huang C et al., Cellular basis of diabetic nephropathy: II. The transforming growth factor-betasystem and diabetic nephropathy lesions in type I diabetes. Diabetes 2002; 51: 3577-8