

Evaluation of Some Biochemical and Physiological Indicators in Some Males with Type 2 Diabetes in the City of Samarra

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Abstract:

Diabetes is a chronic endocrine disorder characterized by hyperglycemia resulting from absolute or relative insulin deficiency. There are a number of different causes of diabetes but the majority of cases are classified as either type 1 or type 2 diabetes. The pathophysiology of type 1 diabetes derives from autoimmune destruction of insulin-secreting pancreatic beta cells, leading to insulin deficiency and subsequent hyperglycemia. Type 1 diabetes accounts for about 10-15% of all diabetes cases. Type 2 diabetes is characterized by abnormal insulin secretion due to peripheral resistance and accounts for 85-90% of all people with diabetes. While type 1 diabetes usually presents in childhood or adolescence and type 2 diabetes at a later stage, clinical manifestations and progression vary widely and some patients may not be clearly classified as having type 1 or type 2 initially. Type 1 diabetes may occur at any age, and with its late onset usually shows slower progression, type 2 often appears earlier in life, even in childhood and adolescence, sometimes allowing an accurate diagnosis only over time. In the uncontrolled state, both types of diabetes are characterized by increased hepatic glucose production and decreased glucose uptake in muscle and adipose tissue. Patients with type 1 diabetes are at risk for severe lipolysis leading to diabetic ketoacidosis. Residual insulin activity in type 2 diabetes usually inhibits lipolysis and ketone production. Environmental factors and their relationship to diabetes, the prevalence of diabetes in China has increased significantly in recent decades, with estimates suggesting that more than 100 million people have the disease at present. During this period there was an increase in obesity rates and a decrease in physical activity. Many changes in lifestyle and diet are the result of increasing economic development and urbanization. In addition to the increasingly Western diet, the traditional

Chinese diet also plays a role, as the quantity and quality of rice intake are linked to the risk of developing type 2 diabetes. Familial factors including inherited genetic variants are important, although differences in genetic architecture suggest that a different set of genetic variants could be more important in Chinese compared to Europeans. Recent developments have also emphasized the role that early life factors play in the epidemic of diabetes and non-communicable diseases: maternal undernutrition, maternal obesity, and gestational diabetes are associated with an increased risk of diabetes in the offspring. The mismatch between developmentally programmed biology and modern environment is important for countries like China where rapid economic transformation has occurred. Multisectoral efforts to address risks at different stages throughout the life cycle will be needed to reduce the burden of diabetes.

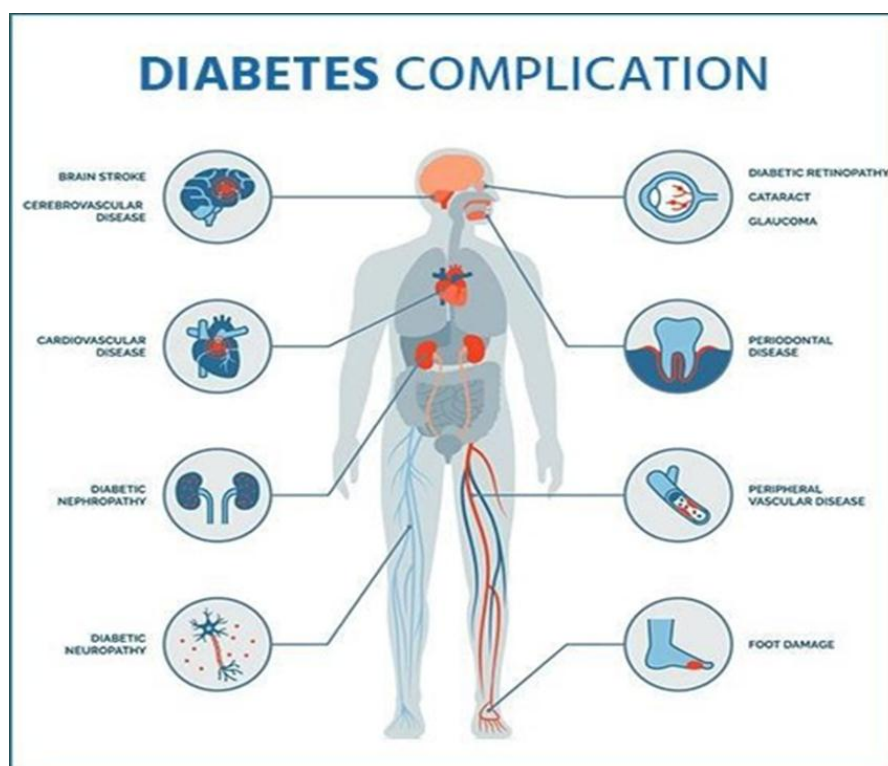
Introduction:

Introduction to diabetes and its classifications, Type 1 diabetes is the main type of childhood diabetes but can occur at any age. It cannot be prevented. People with type 1 diabetes need insulin to stay alive, Type 2 diabetes represents the vast majority (more than 90%) of diabetics worldwide. There is evidence that type 2 diabetes can be prevented or delayed, and there is accumulating evidence that remission from type 2, .diabetes may sometimes be possible, Obesity and diabetes are closely linked, as obesity is a common and major risk factor when talking about diabetes, especially type 2. Obesity is also linked to insulin resistance, which is one of the precursors to the disease. [1], The pathological sequence of type 2 diabetes is complex and requires many different elements working in concert to cause this disease. There must be a genetic predisposition, although so far very little is known about the specific genetic defects in this disease. The occurrence of the diabetic phenotype depends on several environmental factors that share the ability to stress the glucose .homeostasis system, with the current situation [2]. Subtypes of type 2 diabetes are determined by clinical criteria: Type 2 diabetes is defined by a single metabolite, glucose, but is increasingly recognized as a highly heterogeneous disease, including individuals with different clinical characteristics, such as disease progression, response to medications, and risk of complications. Identifying subtypes with different risks and disease etiologies at diagnosis could open prospects for personalized medicine and allow clinical resources to be focused on patients who are most at risk of developing diabetes complications, thus improving patient health and reducing health costs. The availability of more homogeneous populations is also an increasing strength in experimental, genetic, and clinical studies. Clinical parameters are readily available and reflect relevant disease pathways, including the effects of genetic and. environmental exposures, We used six clinical criteria (age at diabetes onset, HbA1c, body mass index, and measures of insulin resistance and insulin secretion) to group adult-onset diabetes into five subtypes. These subtypes have been strongly replicated in many populations and have been associated with varying risks of complications, comorbidities, genetics, and response to treatment. Importantly, the group with severe insulin-deficient diabetes had the highest risk of developing retinopathy and neuropathy, while the group with severe insulin- resistant diabetes had the highest risk of diabetic kidney disease and fatty liver, underscoring the importance of insulin resistance to degeneration. Liver in type 2 disease. In conclusion, we believe that subclassification using these relevant parameters can provide a framework for personalized medicine in diabetes [3]. Diabetes is a chronic endocrine disorder characterized by hyperglycemia resulting from absolute or relative insulin deficiency. There are a number of different causes of diabetes but the majority of cases are classified as either type 1 or type 2 diabetes. The pathophysiology of type 1 diabetes derives from autoimmune destruction of insulin-secreting pancreatic beta cells, leading to insulin deficiency and subsequent hyperglycemia. Type 1 diabetes accounts for about 10-15% of all diabetes cases. Type 2 diabetes is characterized by

abnormal insulin secretion due to peripheral resistance and accounts for 85-90% of all people with diabetes. While type 1 diabetes usually presents in childhood or adolescence and type 2 diabetes at a later stage, clinical manifestations and progression vary widely and some patients may not be clearly classified as having type 1 or type 2 initially. . Type 1 diabetes may occur at any age, and with its late onset usually shows slower progression, type 2 often appears earlier in life, even in childhood and adolescence, sometimes allowing an accurate diagnosis only over time. In the uncontrolled state, both types of diabetes are characterized by increased hepatic glucose production and decreased glucose uptake in muscle and adipose tissue. Patients with type 1 diabetes are at risk for severe lipolysis leading to diabetic ketoacidosis. Residual insulin activity in type 2 diabetes usually inhibits lipolysis and ketone production.[4]

4-1 Environmental factors and their relationship to diabetes, The prevalence of diabetes in China has increased significantly in recent decades, with estimates suggesting that more than 100 million people have the disease at present. During this period there was an increase in obesity rates and a decrease in physical activity. Many changes in lifestyle and diet are the result of increasing economic development and urbanization. In addition to the increasingly Western diet, the traditional Chinese diet also plays a role, as the quantity and quality of rice intake are linked to the risk of developing type 2 diabetes. Familial factors including inherited genetic variants are important, although differences in genetic architecture suggest that a different set of genetic variants could be more important in Chinese compared to Europeans. Recent developments have also emphasized the role that early life factors play in the epidemic of diabetes and non-communicable diseases: maternal undernutrition, maternal obesity, and gestational diabetes are associated with an increased risk of diabetes in the offspring. The mismatch between developmentally programmed biology and modern environment is important for countries like China where rapid economic transformation has occurred. Multisectoral efforts to address risks at different stages throughout the life cycle will be needed to reduce the burden of diabetes [5] Insulin resistance, Insulin resistance is clinically defined as the inability of a known amount of exogenous or endogenous insulin to increase glucose uptake and utilization in an individual as much as it does in the normal population. The action of insulin is the result of insulin binding to a plasma membrane receptor and transported through the cell via a series of protein interactions. Two main sets of protein interactions mediate insulin action within cells: one pathway involved in the regulation of intermediate metabolism and the other playing a role in controlling growth and divisional processes. The regulation of these two distinct pathways can be separated. In fact, some data suggest that the pathway regulating intermediary metabolism is diminished in type 2 diabetes while regulation of growth and mitotic processes is normal. Several mechanisms have been proposed as possible causes underlying the development of insulin resistance and insulin resistance syndrome. These include: (1) genetic abnormalities of one or more proteins that facilitate insulin action (2) fetal malnutrition (3) increased visceral obesity. Insulin resistance occurs as part of a group of cardiovascular and metabolic disorders commonly referred to as “insulin resistance syndrome” or “metabolic syndrome.” This combination of abnormalities may lead to the development of type 2 diabetes, accelerated atherosclerosis, hypertension, or polycystic ovary syndrome depending on the genetic background of the individual who develops insulin resistance. In this context, we need to consider whether insulin resistance should be defined as a disease entity that needs to be diagnosed and treated with specific medications to improve insulin action. Obesity is a causative factor in diabetes associated with insulin resistance. In obese individuals, higher amounts of non-esterified fatty acids, glycerol, hormones, and pro-inflammatory cytokines that may be involved in the development of insulin resistance are released by adipose tissue. Moreover, endoplasmic reticulum stress, adipose tissue hypoxia, oxidative stress, lipodystrophy, and genetic background have a role in insulin resistance. However, no effective drug therapy for type 2 diabetes has been developed that targets these physiological factors. This may be due to a lack of agreement on the overall mechanism of insulin

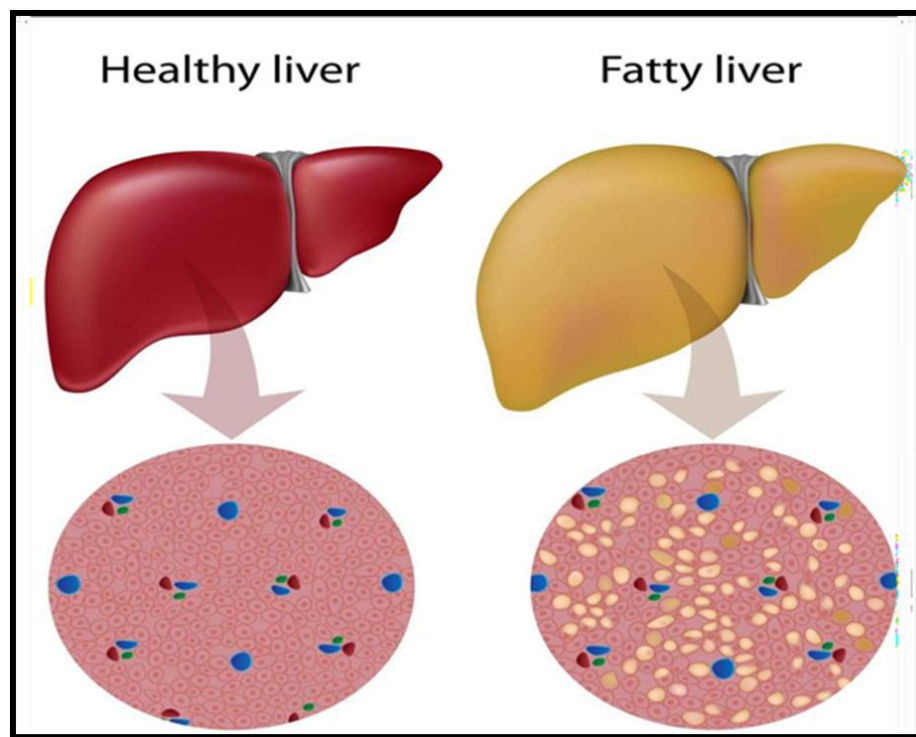
resistance. Fats, their causes and their relationship to diabetes Obesity exacerbates the cause of type 2 diabetes by stimulating insulin resistance. Type 2 diabetes treatment has been restricted due to a lack of understanding of insulin resistance. However, several studies have described the relationship between mitochondrial dysfunction, inflammation, hyperinsulin, and seborrhea with insulin resistance. Endoplasmic reticulum stress, oxidative stress, hereditary background, aging, hypoxia, and lipid dystrophy were also mentioned in the cause of type 2 diabetes by induction of insulin resistance. However, none of these concepts led to The discovery of effective medicines for type 2 diabetes, and the reason may also be a lack of agreement on the related mechanisms of insulin resistance. 7 Tulle-like receptors are found, within the family of receptors that recognize patterns and play an indispensable function in fungal immunity and determine tissue injury through the molecular patterns associated with risk. Studies have reported that among the different types of tulle-like receptors of type 2 and type 4, type 4 has a role in insulin resistance associated with inflammation during obesity. In obese mice and people with diabetes, the expression of type 4 tulle-like receptors appeared in adipocytes, liver and muscle cells, and the hypothalamus is increased and negatively affects insulin sensitivity. Another study also revealed that during obesity, metabolic internal blood poisoning leads to the development of infections and metabolic disorders by activating type IV-type receptors in metabolic tissues. On the other hand, inhibition of type I 4 tulle-like receptors reduces oxidative stress by reprogramming the metabolic mitochondria in visceral fat, and reduces insulin resistance caused by obesity. Additionally, different tulle-like receptors were developed to regulate excessive inflammation; These are them; Small molecule inhibitors, antibodies, lipid isotopes, micro-RNAs, and nano-inhibitors.



7-1 The influence of genetic factors

Genetic factors associated with insulin resistance: Not only insulin receptor and gene polymorphisms affect insulin signaling, but also other gene polymorphisms e.g. Separation of the beta-3 adrenergic receptor gene, from the adrenergic receptor gene and the glucose transporter protein gene associated with visceral obesity, may lead to enhanced insulin resistance. A study revealed that type 2 diabetics and their relatives showed reduced stimulation of whole-body glucose disposal by insulin. This impairment in glucose disposal was primarily associated with decreased

insulin-mediated glucose storage in the form of glycogen. The rate of whole-body glucose disposal in people with normal fasting glucose concentrations is also affected by glucose transport protein levels.(7). The effect of diabetes on liver function, This study led to knowing how the hormones cortisol and leptin lead to weight gain. Samples were collected from Tikrit, Salah al-Din Governorate, and the results showed a significant increase in the concentration of the hormone cortisol within normal limits in people who suffer from obesity and overweight compared to those with normal weight, and the value of the significant increase is greater than or equal to 0.05. The results showed a significant increase between the concentration of the hormone leptin in people suffering from obesity and overweight compared to normal weight, reaching 0.01. It has been proven that there is a significant difference in the concentration of alanine aminotransferases in obese and overweight people compared to normal people, while there are no statistically significant differences in the concentration of aspartate aminotransferases between obese and overweight people compared to Normal people, while the results showed a significant increase in the concentration of aspartate aminotransferases among obese and overweight people compared to normal people. As the concentration of the alkaline phosphatase enzyme in people who suffer from obesity and overweight compared to the normal group showed a significant increase of 0.01, we conclude from this that the hormones leptin and cortisol rise significantly in people who have a significant increase in weight, and also, based on this, liver enzymes. Such as the enzyme alkaline phosphatase and an increase in alanine aminotransferase due to an increase in the hormone leptin, which is considered a cause of obesity due to its increased secretion in the body.



Liver disease and elevated liver enzymes are common in type 2 diabetes and may be multifactorial in origin. However, there are very few studies available on the exact prevalence of this phenomenon. We conducted an observational study of the prevalence of high point liver enzymes in eight diabetes units in Italian hospitals. Data from 9621 consecutive type 2 diabetic patients (males, 52.4%; mean age, 65 years) were analyzed, and levels of alanine, aspartate aminotransferase, and glutamyltransferase were associated with body mass index, metabolic control, and the presence of metabolic syndrome. Levels of alanine aminotransferase, aspartate transaminase, and glutamyltransferase exceeding the upper limit of normal were present in 16%, 8.8%, and 23.1%, respectively. The prevalence was higher in males, and increased with the category of obesity and

poor metabolic control. It decreases with age. Elevated enzymes have been systematically associated with most metabolic syndrome factors. After correcting for age, sex, BMI, and differences between centers, triglyceride levels increased/fibrate treatment [OR 1.57; The 95% confidence interval [1.34-1.84] and extended waist circumference (1.17-1.85%, 95% CI) were the only parameters independently associated with elevated alanine aminotransferases. In a separate analysis, the presence Metabolic syndrome significantly predicted elevated liver enzymes. After excluding positive cases of level II and III hepatitis, tested at two centers, the prevalence of elevated enzymes decreased by approximately 4%, but the association with metabolic syndrome did not change significantly. The high prevalence of elevated liver enzymes in type 2 diabetes is consistent with the clear risk of progressive liver disease, and a large number of diabetic patients may require comprehensive clinical, laboratory, and histological examinations(9). Laboratory equipment and materials used, In this research project, the following laboratory equipment and materials were used: Tools for drawing blood samples - A measuring tape included for the purpose of taking measurements of people's waist and neck circumferences. Tubes for storing blood samples, which were: - Yellow tubes (gel tubes) that separate plasma from the blood sample for the purpose of measuring clotting factors in the blood sample- Violet tubes: which contain the EDTA agent and are used in a variety of blood tests, such as blood imaging and blood group analysis: Laboratory equipment used, Blood image detection device -Device to measure liver functions and enzymes - Device to measure cumulative blood sugar levels -Biochemical tests used, Tests performed: LDL: It is a type of lipoprotein that transports cholesterol and triglycerides -from the liver and to surrounding tissues, HDL: High-density lipoprotein, is a type of high-density cholesterol found -in the blood, ALP: It is one of the blood plasma enzymes that works in alkaline medium. - The effectiveness of alkaline phosphate in plasma increases as a result of multiple conditions, including normal physiological conditions and. pathological ones indicating specific lesions, ALT: It is a transport enzyme that is found in high quantities in the liver - and is found in blood serum. Its measurement is used to diagnose chronic liver. Diseases, AST: Aspartate transaminase for short. It is also called aspartate -aminotransferase for short in blood serum. This enzyme is also called glutamic oxaloacetic transaminase. It is an enzyme found in the cells of the body, especially in the heart and liver, and to a lesser extent in the kidneys and muscles. The levels of the enzyme aspartate transaminase in the blood of healthy people are low. WBC: white blood cell count examination - HPA1C: Hemoglobin test, which is a type of hemoglobin that is mainly - used to identify plasma and glucose levels, Sample collection: Sample collection samples were collected, including 25 samples from people free of the 50 disease (control group). They were taken from Samarra/Samarra University, And 25 samples from people with type 2 diabetes were taken from .Samarra/Samarra General Hospital Type 2 diabetes were taken from Samarra, On the next page is a graph representing the samples collected

characteristics	T1	T2
AGE	33.00 ± 2.68 a	38.44 ± 2.86 a
WIEGHT	79.28 ± 2.72 b	98.28 ± 3.48 a
Waistline	99.04 ± 2.21 b	113.96 ± 3.74 a
Neck circumference	40.76 ± 0.75 b	45.72 ± 0.82 a
ALP	55.80 ± 3.00 a	50.72 ± 3.52 a
ALT	33.76 ± 1.37 b	67.16 ± 4.31 a
AST	31.48 ± 3.56 b	61.08 ± 3.22 a
HDL	52.84 ± 2.68 a	35.60 ± 1.92 b
LDL	61.96 ± 3.06 b	113.40 ± 4.59 a
WPC	7.41 ± 0.39 a	5.38 ± 0.35 b
HPA1C	51.84 ± 2.51 b	81.68 ± 3.22 a

Table (1): statistical analysis of the results.

Statistical analysis of the results: The results showed that the affected group had a higher average age, and also a higher weight It was associated with the incidence of the disease with a significant difference, and the incidence was associated with a larger waist circumference with a significant difference, Significantly, it was also associated with the larger neck circumference of the affected group with a significant difference of 0.82, and showed, The results showed that the ALP enzyme increased in the affected group with a significant difference, and the ALT enzyme increased in the affected group, The infected group had a significant difference of 4.31, and the AST enzyme increased in the infected group with a significant difference, while it was found that HDL increased in the healthy group with a significant difference, while LDL increased in, The infected group had a significant difference, and white blood cell WbC increased in the healthy group, With a significant difference, the cumulative blood sugar (HPA1C) increased in the affected group with a significant difference. Researcher recommendations: The effect of diabetes and the control of similar growth factors Insulin in young people with type 1 diabetes. The role of antioxidants in managing diabetes and its complications, Diabetes and its effect on bone healing and fractures.

Conclusion

The study included the collection of 50 samples, consisting of 25 samples from males without diabetes and 25 samples from males with diabetes. The samples were collected from Samarra General Hospital and from the University of Samarra. A set of analyzes were conducted on these samples for the purpose of comparing the healthy group and the affected group in terms of proportions. Accumulated sugar, blood components, blood condition, physiological functions of the liver, and liver health. These tests were for the CBC blood picture, HPA1C, and. measurement of liver enzymes (ALT, AST, ALP, HDL, LDL) Measurements of waist circumference, neck

circumference and weight were also taken in order to meet the medical condition for these patients to be considered to have type 2 diabetes, which causes obesity, Objectives of the study: This study aimed to know the effect that type 2 diabetes has on liver efficiency, as well as the amount of change in harmful and beneficial liver enzymes and cumulative sugar measurements in patients and healthy people, and to compare the healthy group with the affected group in biochemical changes in liver functions and enzymes in males in the city of Samarra

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