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A narrative Review about Common Complications of Type 1 Diabetes

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Abstract

Type 1 diabetes (T1D), or insulin-dependent diabetes, is a persistent autoimmune problem and a type of diabetes in which insulin levels are low on account to the demolition of pancreatic beta cells. It is one of the most common health problems of our time. Although blood glucose levels can be controlled, there is a risk of complications that can have a negative impact on daily life. This review aims to list and summarize the common complications of this disease that occur after infection, as they require continuous monitoring and fruitful management strategies. Health care providers should have a comprehensive and organized program that includes ongoing and organized testing of patients, educational support, psychological support for the patient, and improving glucose control as a basic requirement for maintaining general health and reducing complications.

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1. Introduction

Diabetes is often associated with children, but it affects people of all genders, races, and ages. To control it, the patient needs to use insulin daily and regularly ^[1,2]. Its risks still pose a clinical obstacle despite the development of advanced treatments in this era, as type 1 diabetes is either acute or chronic, and both have clearly harmful disadvantages ^[3,4]. To control it, the health staff must be qualified, prepared, and equipped with the latest medical devices and equipment.

1.1. The First Type of Complication or Acute Complication

Fluctuations in blood sugar levels in the affected individual can lead to several risks, including the following:

1.1.1. Type1 Diabetes and Hyperglycemic Crises

Hyperglycemia is common among people with diabetes, occurring whenever blood glucose scales are rising. This frequent rise in blood glucose is a common complication of diabetes ^[5]. Hyperglycemia is common among diabetics, occurring when blood glucose levels rise. This frequent rise necessitates frequent blood glucose spikes in diabetic patients. One of its complications is diabetic ketoacidosis, which occurs due to a significant decrease in insulin concentration. Insulin is the primary and essential cause, in addition to other factors that can lead to this type of dangerous complication ^[6,7]. Although rare, HHS is characterized by soaring blood glucose scales without causing a state of ketosis ^[8]. This disease mainly affects the elderly or people with other health conditions, and may cause severe dehydration, kidney failure, and nerve weakness ^[9]. Early detection and treatment of diabetic ketoacidosis, hyperosmolar hyperglycemic syndrome, and hyperglycemia are essential to limit the progression of their consequences ^[10], [Figure1] below shows the relationship between type 1 diabetes and hyperglycemia ^[11].

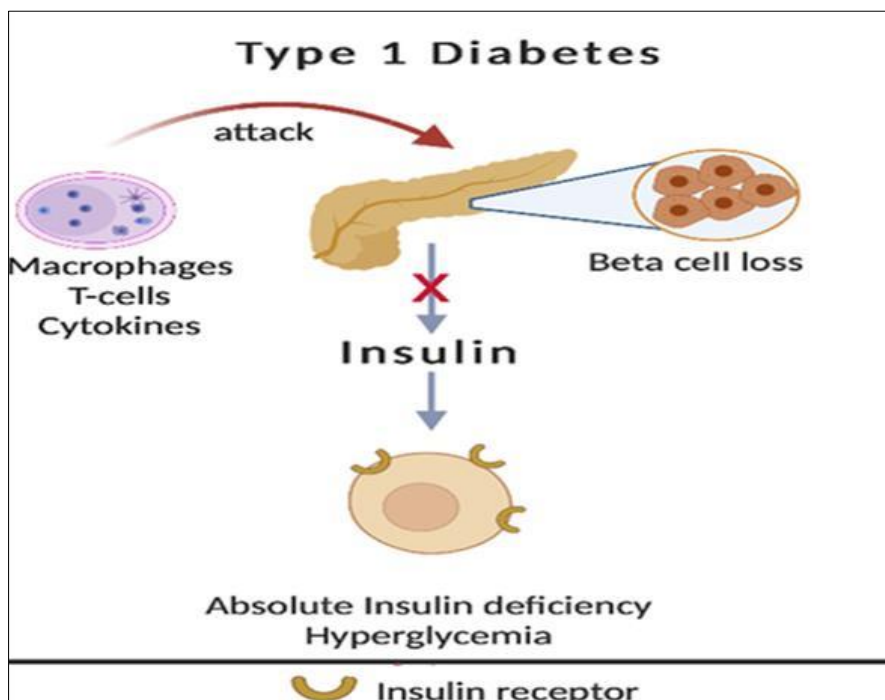


Fig 1: Relation between type 1 diabetes and hyperglycemia ^[11]

1.2. Type1 Diabetes and Hypoglycemia

The above hyperglycemia is contrasted with hypoglycemia, which is common in T1D and is caused by raised insulin intake, stress from exercise, or poor nutrition ^[12]. Mild hypoglycemia can be treated by consuming fast-absorbing carbohydrates, while severe or worsening hypoglycemia can lead to seizures or a state of mild unconsciousness, and there

is a high probability of death ^[13]. The possibility of recurrent episodes of hypoglycemia leads to the patient entering a state of unconsciousness, which reflects the person's loss of the symptoms that guide them to the early warning signs, and this in turn leads to a worsening of the uncontrolled health condition^[14], [Figure 2] below shows the relationship between type 1 diabetes and hypoglycemia ^[15].

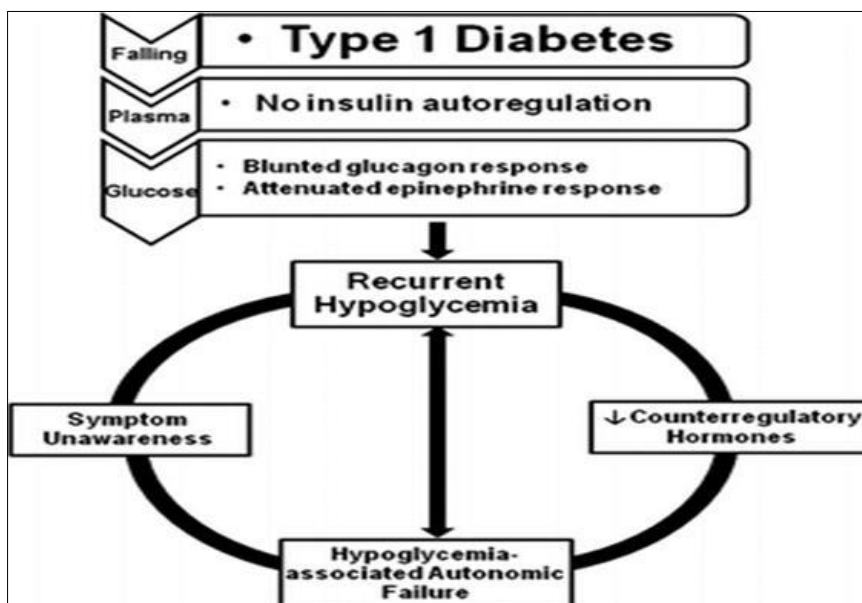


Fig 2: Relation between type 1 diabetes and hypoglycemia ^[15]

2. The Second Type of Complication or Chronic Complications

Chronic complications of T1D develop over a long period of time and are largely related to prolonged hyperglycemia and its associated metabolic consequences [16].

2.1. Type1 Diabetes and Cardiovascular Disease

Cardiovascular disease is a potential problem for people with T1D. There are many factors that play an active role in

exacerbating these diseases, including high blood sugar, dyslipidemia, high blood pressure, and obesity [17]. Cell dysfunction, leading to atherosclerosis, is exacerbated by chronic inflammation and oxidative stress [18]. T1D patients are advised to undergo regular cardiovascular assessments, including checking lipid levels and monitoring blood pressure, in order to start taking preventive measures early [19]. [Figure 3] below shows the relationship amidst T1D and cardiovascular disease [20].

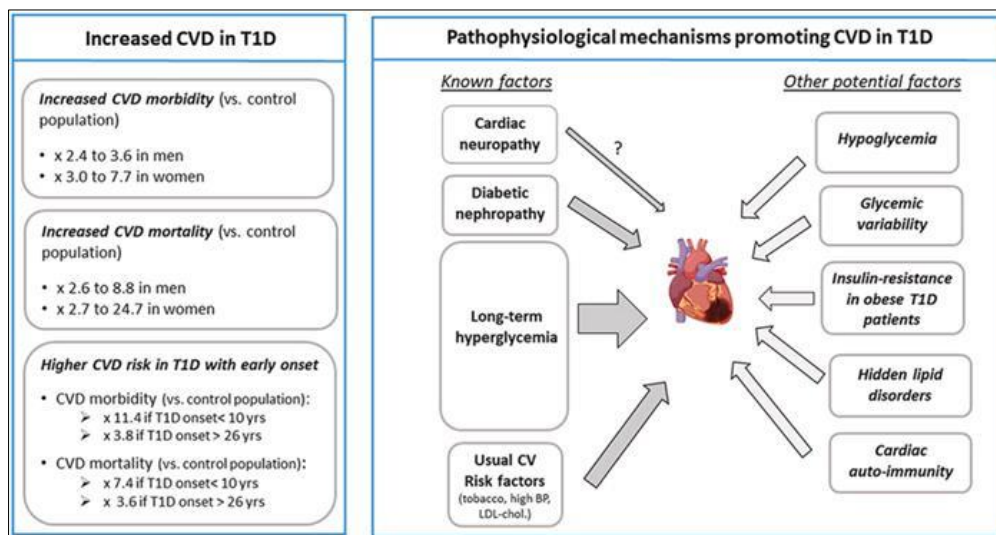


Fig 3: Type 1 diabetes and cardiovascular diseases [20]

2.2. Type1 Diabetes and Nephropathy

The kidneys can lose their proper function and eventually stop functioning altogether due to type 1 diabetes, which causes what is known as diabetic nephropathy [21]. Rising blood glucose grades harming renal micro blood tubules, increasing glomerular filtration

and the appearance of albumin in the urine [22]. Early detection of micro albuminuria through routine urine tests is very important, as intensive treatment with angiotensin-converting enzyme ACE inhibitors can slow disease progression [23]. [Figure 3] below shows the relationship amidst T1D and kidney ailment [24].

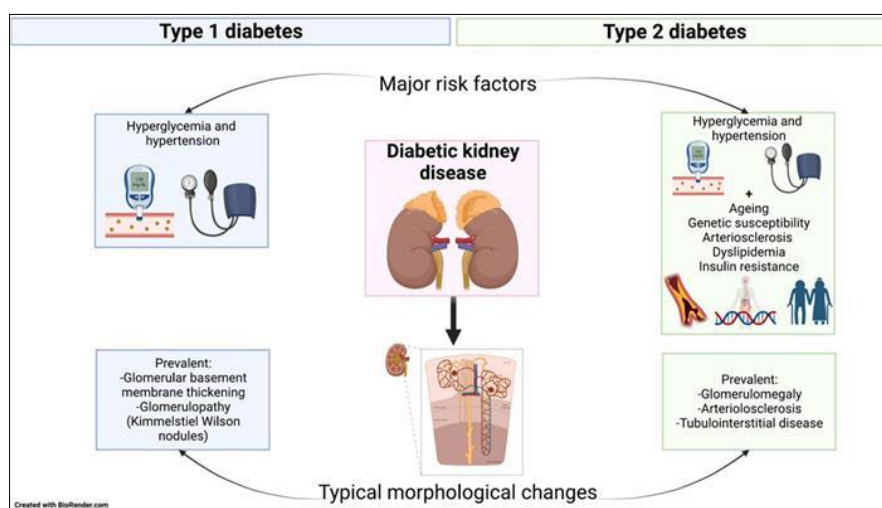


Fig 4: Relation between T1D and renal ailment [24]

2.3. Type1 Diabetes and Retinopathy

Diabetic retinopathy affects the blood vessels in the retina, causing blurred vision and blindness [25]. The appearance of neovascularization is what characterizes proliferative diabetic retinopathy, and is often asymptomatic until

significant damage occurs [26]. Regular eye examinations are essential for early detection of this disease, as prompt interventions such as laser treatment can help reduce vision loss [27], [Figure 5] below shows the relationship between type 1 diabetes and eyes disease [28].

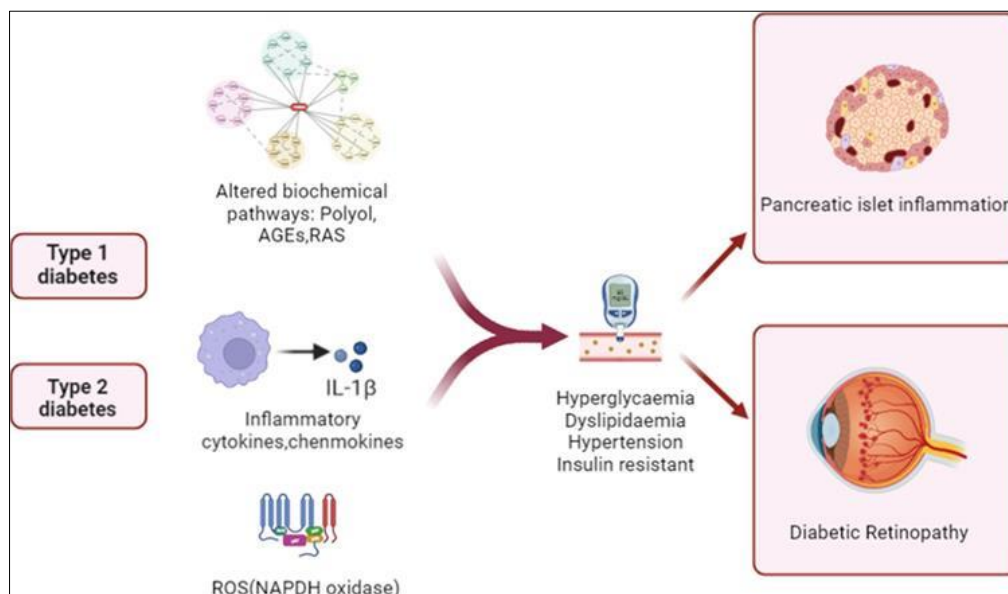


Fig 5: Relation between type 1 diabetes and kidney diseases ^[28]

2.4. Type1 Diabetes and Neuropathy

One of the risks resulting from high blood sugar due to type 1 diabetes is optic nerve damage, which affects involuntary eye movements. It is a systemic disorder known as autonomic ophthalmopathy ^[29]. Symptoms can range from pain and numbness in the extremities,

to digestive disorders and cardiovascular problems ^[30]. Management includes improving blood sugar control, pain management, and regular evaluations to prevent complications including foot ulcers ^[31], [Figure 5] below shows the relationship between type 1 diabetes and neuropathy ^[32].

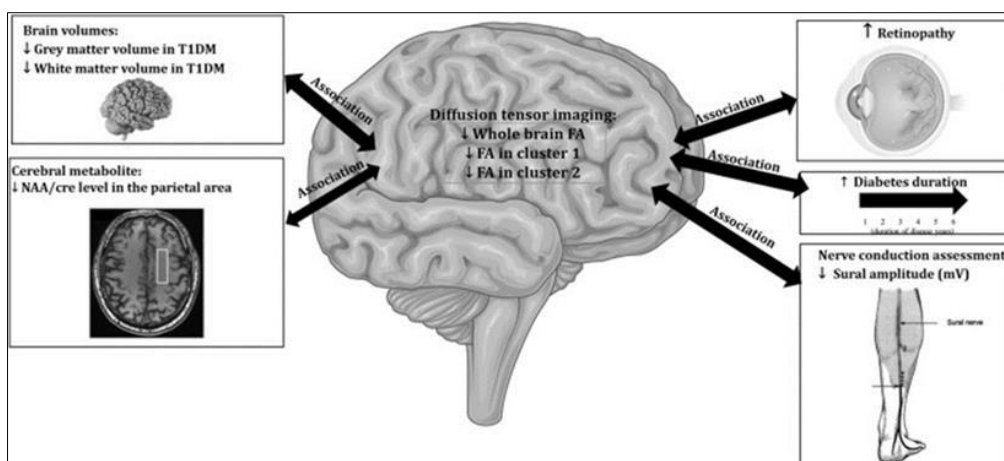


Fig 6: Relation between type 1 diabetes and neuropathy ^[32]

2.5. Type1 Diabetes and Psychosocial Impacts

The responsibility of managing T1D goes beyond physical health ^[33]. Students and adults with T1D experience psychological complications such as anxiety, depression, and distress as a result of having the disease ^[34]. The ongoing nature of the disease can lead to feelings of fatigue and

exhaustion, especially in adolescents who face difficult social challenges at this age ^[35]. Support networks, counseling and educational resources are resources to meet these needs, whether psychological or social ^[36], [Figure 5] below shows the relationship between type 1 diabetes and neuropathy ^[37].

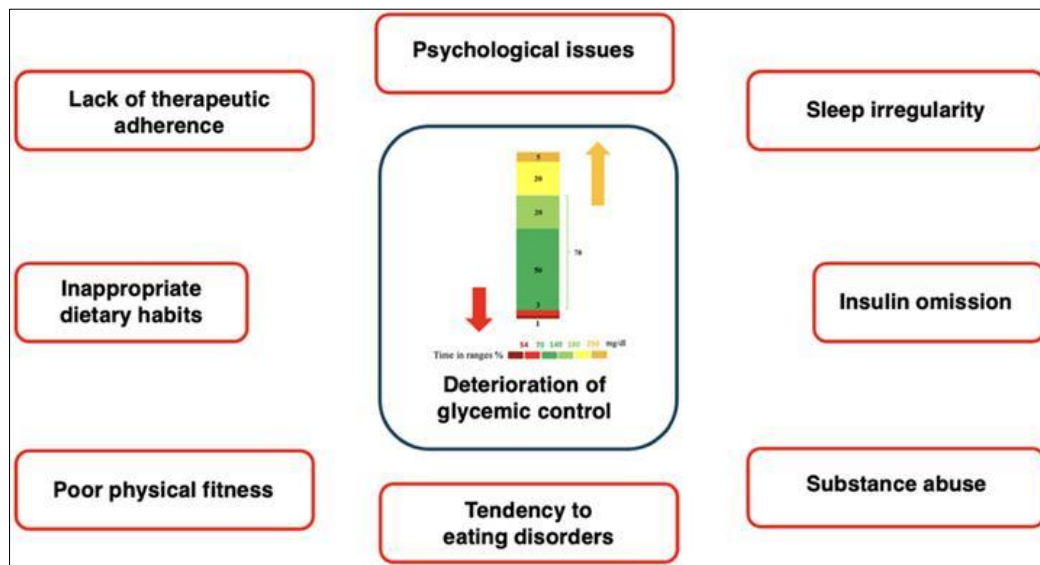


Fig 8: Relation between type 1 diabetes and kidney diseases ^[37]

3. Conclusion

Type 1 diabetes poses significant threats due to its acute and chronic complications that can significantly impact the lives of those affected. Predicting disease complications before they occur is considered an effective treatment method because it reveals what is happening and allows for the development of appropriate solutions to control it. This prediction includes the organs that may be affected, such as the heart, kidneys, and eyes. To determine this, continuous monitoring and periodic examination of these organs are necessary. The correct and well-planned approach to limiting and controlling these complications lies in a scientific approach. This involves encouraging scientists and researchers in this field to focus on how to control this dangerous epidemic by rehabilitating patients, providing them with medical and psychological guidance, and updating equipment, devices, and treatments. This occurs when health, psychological, and social environments work together.

Consent for Publication

Not found

Founding

None

Conflict of Interest

There was no conflict of interest.

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None

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