

Short Commentary

Interpretation of the Emergence of Type 1 Diabetes in Patients with Covid-19

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Abstract

Sudden emergence of the Covid-19 virus has led to a state of panic among the responsible sections and among the citizens, just like any new virus, and this state of panic arises from the lack of knowledge of the genetic makeup of the virus, its symptoms, methods of spread, the diseases that help to spread it, the people most vulnerable to infection. This has prompted the authorities responsible for scientific research in all countries, whether Arab or European, to intensify efforts to uncover the mystery of this new virus, and communication channels has been opened between all countries to benefit from the results that have been reached. Most of the studies have collected some Covid-19 infected people who were diagnosed with diabetes type 1, with different ages, geographical diversity and standard of living. All this prompted scientists to investigate the reason behind this link between Covid-19 and type 1 diabetes, and some of them explained that Covid-19 virus enters cells through ACE2 which present in high amount in cells of the pancreas, so they explained that virus enters the pancreas through it and affects the beta cells responsible for the secretion of insulin, and then it prevents its secretion, caused hyperglycemia, causing type 1 diabetes. Others scientists have explained that the relationship arises through the drugs that patients with Covid-19 virus take, as it was found that these patients are treated by anti-virus, Glucocorticoids, and this group works to reduce the effect of insulin and increase the level of glucose, which causes it to rise in the blood and cause diabetes type 1. This review is designed to study the relationship between Covid-19 virus and diabetes type 1.

Keywords: Diabetes type 1; COVID19; ACE2; Pancreas; Beta cells; Insulin; Antiviral; Glucocorticoids.

Introduction

Covid-19 was discovered for the first time in December 2019 in Wuhan, China. Many studies have been carried out to find out what the virus are, ways of spreading and ways to prevent it, and groups most susceptible to infection, in addition to diagnostic methods and treatment methods [1,2].

Since this virus is considered new, despite its similarities with other viruses that infect the respiratory system, such as SARS and MERS, discovering everything about that virus will require more time, effort, and studies to find out the

dimensions of the situation [3].

Studies have proven that Covid-19 adversely affects many body systems, especially the lungs, liver, and kidneys, and that the harmful effect continues even after recovering from the virus infection [4].

The surprise came in the harmful effect of the Covid-19 virus on the pancreas, as it destroyed it, and that was the reason for the failure of the insulin responsible for controlling the level of sugar in the blood, which led to the development of insulin dependent diabetes (diabetes type 1) [5].

Among the cases that were discovered in Germany, where the symptoms of infection with the Covid-19 virus appeared on the father and mother, and analyzes were made on the son who was not more than 19 years old, it was found that he was already infected despite the absence of symptoms of infection on him, but when he arrived at the hospital it was found that he was suffering from other symptoms It has nothing to do with the symptoms of Covid-19, as he lost a lot of weight, was suffering from increased urination, and pain on the left side, all of which were similar to the symptoms of diabetes, so the blood glucose level was measured and found to reach 500 mg/dL [6].

This prompted doctors to diagnose the condition as type 1 diabetes after they found a change in the genetic content of some genes, but it is different from the genetic changes that exist in people diagnosed with diabetes type 1, but did not find antibodies such as those found in serums of diabetes type 1, 2 [7].

So scientists became confused about whether Covid-19 causes diabetes 1, diabetes 2, or a new type.

This prompted scientists to conduct research in this area, where they found that pancreatic cells contain ACE2 re-

ceptors. It has been observed that the protein in the spine of virus 19 communicates with cells through these receptors. As well as it leads to damage to the pancreatic cells responsible for secreting insulin, and thus the secretion is reduced or absent, so the patient needs to have insulin injections to prevent the high level of glucose in the blood [8].

Diabetes due to Covid-19 infection is similar to autoimmune diabetes, in which the immune system fails to differentiate between healthy cells and damaged cells due to infection, which attacks healthy cells and leads to their destruction [9].

In addition, we find that beta cells are less in ability than alpha cells to counteract virus infection, and that when the beta virus cells are infected; this stimulates them to produce a large amount of MHC-1, which in turn helps in causing autoimmune diseases (Figure 1) [10].

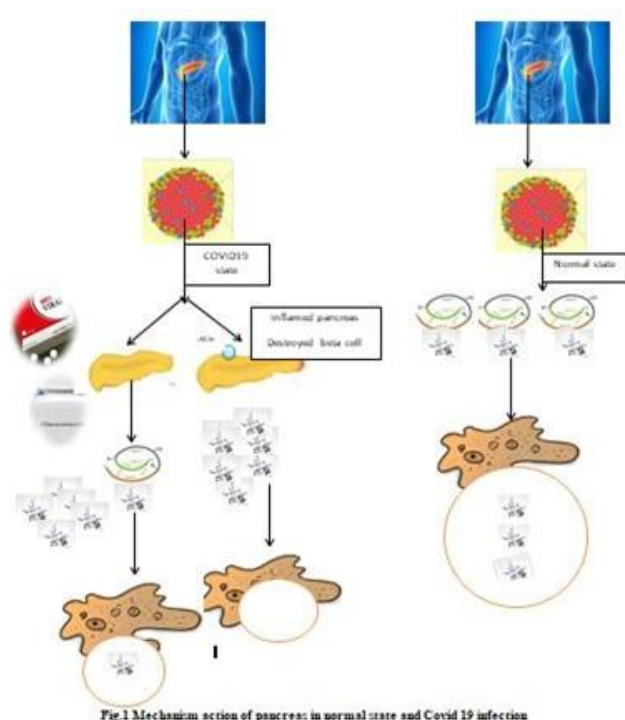


Fig 1 Mechanism action of pancreas in normal state and Covid 19 infection

Figure 1: Mechanism action of pancreas in normal state and Covid-19 infection

In many countries of China, Germany and Italy, statistics showed a decrease in the number of people with type 1 diabetes after taking precautionary measures and staying at home, as the low rates of Covid-19 infection coincided with the shortage of new people with type 1 diabetes [11].

It is certain that there is a relationship between diabetes, either type 1 or type 2, and a weak immune system. Where it was observed that when examining the serums of diabetic patients and ears, they were exposed to Covid-19, a high coagulation factor, and inflammatory factors such as cytokine and interleukin [12].

The difficulty in controlling glucose levels in the serum of these patients contributed to the slow recovery process

from diseases and the high death rate compared to others who do not suffer from diabetes [13]. In an American study of 64 people infected with Covid-19 virus, 50% of them had a high level of diabetes and were diagnosed with type 1 diabetes [14].

In a study in England, it was found that high mortality rates in type 1 diabetes, where the severity rate was 2.86, while the risk rate was 1.80 in patients with type 2 diabetes [15].

One of the factors that affect the high death rates in patients with type 1 diabetes who have been exposed to Covid-19 is the difficulty in controlling blood glucose levels due to the drugs they take to control the virus, as it was found that although Hydroxychloroquine is used to stimulate a device Immunity to overcome the virus leads to a decrease in glucose levels in the blood by transporting it to cells through insulin, but antivirals help to increase the rate of glucose, and the Glucocorticoids that are used in the treatment of respiratory problems raise glucose levels by reducing sensitivity to insulin, and interferes with Glucagon action [16].

It was noted that there is a similarity between Covid-19 and SARS in that both enter the cell through the ACE2 receptor [17].

Conclusion

To discover more information about Covid-19, this requires more studies. All responsible authorities must be linked to find out all the problems caused by the Covid-19 pandemic and to develop an emergency strategy to be applied to any other pandemic in the future.

Monitor the diabetes level of people with Covid-19 to make sure that they do not develop diabetes in the long term. Establishing treatment protocols commensurate with the patients' sick history, while developing alternative solutions to avoid the side effects of those drugs used.

Acknowledgments

The authors declare that they have no conflict of interests.

Conflict of Interest

None

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