

5. COVID-19 AND DIABETES MELLITUS: IMPACT ON THE EVOLUTION OF EACH OTHER'S DISEASES

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Introduction. Coronavirus disease (COVID-19) is caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). One of the most common comorbidities present in patients with COVID-19, approximately in 9% to 35% is diabetes mellitus (DM). The reason is that chronic hyperglycemia can alter both innate and humoral immunity. This state of the immune system allows the virus to spread more in the body and then leads to a longer recovery period.

Aim of study. To explore the interaction between COVID-19 and diabetes mellitus, and their influence on each other.

Methods and materials. Were analyzed 32 literature sources using The Lancet, Medline, PubMed, Google Scholar databases over 2 years. Search keywords: “diabetes mellitus”, “covid 19”, “cytokine storm”, “ACE2 receptors”.

Results. Based on the information, there are several mechanisms of interaction between diabetes and the Covid 19 virus, the main of which are ACE2 receptors and cytokine storm. ACE2 is a receptor through which SARS-CoV-2 enters the cell, it is expressed in the lungs, in the pancreas, and many other organs. ACE2 divides Ang 2 into Ang 1-7 when interacting with it. ACE2, Ang 1-7 are vasoprotective parts of the RAAS, leading to vasodilation, an increase in insulin release, low insulin resistance, anti-inflammatory, and antifibrotic reactions. Preventing degradation of Ang II to Ang(1-7) contributes to lung injury and fibrosis associated with COVID-19 and impaired glycemic control in diabetes. SARS-Cov-2 tropism for β -cells leads to acute impairment of insulin secretion or destruction of β -cells, leading to the development of de novo diabetes, the treatment of which was immediately started with insulin. Diabetes and Obesity lead to abnormal secretion of cytokines and a decrease of adiponectin. Adiponectin inhibits the factor NF- κ B, reducing the expression of VCAM, ICAM-1, and E-selectin, anti-atherogenic effect, reducing insulin resistance and inflammation. In turn, SARS-CoV-2 infects circulating immune cells (CD3, CD4, CD8 T cells), causing lymphocytopenia, which reduces control of the innate immune system and increases the secretion of cytokines. Overproduction leads to cytokine storms (IL-6, IL-1 β , TNF α), which leads to a high risk of vascular hyperpermeability, multiple organ failure, and death. These cytokines inhibit insulin signaling, phosphorylate its receptors and lead to insulin resistance.

Conclusion. DM and COVID-19 can impact each other's progression, which leads to faster complications. Knowing their interaction mechanism, it became possible to use targeted therapy.