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COVID-19 and Diabetes: Factors Leading to High Morbidity and Mortality

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ABSTRACT

COVID-19 is a recent pandemic caused by SARS-Cov-2, a novel coronavirus. Diabetes (mostly type 2 diabetes mellitus, T2DM) and hyperglycemia are among the major comorbidities in patients with COVID-19 leading to poor outcomes. Reports show that patients with diabetes and COVID-19 are at an increased risk for developing severe complications including multi-organ failure and death. The potential mechanistic links that could explain the observed higher morbidity and mortality in this patient population will be discussed. Patients with T2DM have an underlying increased level of inflammation that is associated with obesity and insulin resistance in addition to other comorbidities including hypertension, obesity, cardiovascular disease, dyslipidemia and being older. T2DM with hyperglycemia are among factors that lead to elevated expression of ACE2 (which acts as cellular "receptor" for the virus) in lungs and other tissues. We hypothesize that exacerbation of pre-existing chronic inflammation and the resulting intense hyper-immune response ("cytokine storm") play a critical role in increased morbidity and mortality of COVID-19. Based on the available evidence, it is recommended that safe but stringent control of blood glucose, blood pressure and lipids be carried out in patients with T2DM without COVID-19. Once the infection occurs, then attention should be directed to proper glycemic control with use of insulin and frequent monitoring of blood glucose levels by using continuous glucose monitoring devices (where available), especially in patients admitted to ICU. It has been reported that dexamethasone decreases mortality in patients severely affected by COVID-19. Finally, there is growing evidence that immune-based therapies may improve outcomes of severe COVID-19.

Keywords: COVID-19, Diabetes mellitus, Mortality, Inflammation, Insulin resistance, Cytokine storm

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