The Link between Diabetes and Coronavirus (Empirically Based)

Heading into December of 2020, after almost a year of global chaos in the medical field, it is not surprising to notice a growing concern in Special Populations over the coronavirus pandemic. Those with pulmonary restrictions and cardiovascular complications (particularly CHD), have known since the beginning that a contracted case has more serious implications than it would for a standard healthy adult. But what about those with diabetes?

Articulation Station: It is estimated that 10 percent of adults in the United States have some form of diabetes, the vast majority being insulin-resistant diabetes mellitus, commonly known as type II diabetes (Bhupathiraju & Hu, 2016). It is also common knowledge that clinical obesity (BMI>30kg/m^2) puts an individual at higher risk for type II diabetes, thus leading to a significant population of sedentary obese seniors with metabolic disease. Both obesity and diabetes have been shown to predispose a person to infection. Although these are often similar bacteria or sepsis precursors that are dealt with by the general population, being obese or diabetic puts one at a higher risk for complications and increases the time until recovery (Frydrych et al., 2018). According to Hodgson et. al, this susceptibility is due to a blunted immune system. A combination of oxidative stress (via Reactive Oxygen Species) and constant inflammation in a diabetic environment, deteriorates normal antibacterial and T-cell function. Not only are these defensive mechanisms diminished in their unique function, the signaling pathway is disrupted via hyperglycemic-derived dendritic dysfunction (Hodgson et al., 2015).

Direct & Drossless: So, to put it simply, diabetes and obesity are fairly common in the present age. These conditions make it more likely to contract an illness, because simply having one or both weakens your immune system. With that covered, let's move into Covid particularly.

Articulation Station: The number of Covid cases in the diabetic population have been alarmingly high in the past year (consistent with the aforementioned compromised immune function). Diabetes has been reported as the second most common comorbidity to Covid-19 positive patients, falling slightly under CVD. Out of the original 41 patients that contracted the 2019-nCoV (novel coronavirus), 20% of them were confirmed diabetics (Huang et al., 2020). It is important to note the incredibly small sample size, and the possible confounding variables of economic status and subsequent access to healthcare (ability to manage diabetes). A more complete and conclusive meta-analysis of diabetic coronavirus patients was performed in August of 2020 (9 months after the novel outbreak). Upon examining 27 manuscripts it was concluded that 14.5% of Covid patients, within the scope of these studies, were comorbid diabetics (Abdi et al., 2020). Considering the United States is considered one of the leading countries in regards to diabetes prevalence (~10%), a global coronavirus comorbidity of 14.5% is quite significant. In addition, comorbidity with diabetes significantly increases the likelihood of necessitating ICU admittance. Results from a study of 138 coronavirus patients in Wuhan showed that out of the patients requiring ICU admittance, 22% were comorbid diabetics, vs. the 6% that contracted the virus but recovered independent of the ICU (D. Wang et al., 2020). Finally, diabetes seems to be the second highest comorbidity when examining mortality rate, albeit the study was limited in its consideration of disease longevity, regulation of diabetes, etc. (Roncon et al., 2020). However, these results were reinforced in a statistical analysis of the Chinese population in February 2020 (2 months post-virus introduction). Overall likelihood of death from contracting coronavirus was 2.3%, whereas the presence of diabetes more than tripled the chance of mortality at 7.3% (Puig-Domingo et al., 2020). Furthermore, a comorbid patient with diabetes and obesity that

contracts the coronavirus may be especially susceptible to complications due to preexisting hyperglycemic-derived decrements in ventilatory function.

Direct & Drossless: In short, according to the research, having diabetes makes it more likely to get the virus (1.5x), encounter serious complications (3.5x), and ultimately die from it (3.2x). Even though some of the studies were limited, the overlap validated the claims. With that grim assertion let's move onto the prevention.

Articulation Station: Fortunately, the comorbidity of diabetes and related consequences seem to follow a severity gradient contingent on the management of disease. Once a diabetic is diagnosed with coronavirus, it is imperative to keep their blood glucose in check. As explained earlier, the oxidative environment induced by unregulated hyperglycemia, severely cripples the function of the immune system via multiple pathways. In addition, a comorbid diabetic may experience an influx of deleterious glycemic function as a result of the extra metabolic stress from fighting coronavirus (A. Wang et al., 2020). From these conglomerate findings, one specific recommendation for diabetics presents itself (above the standard recommendations for social distancing, sanitation, etc.). Maintaining a healthy blood glucose is key for all people with diabetes mellitus during this pandemic. A tight control to keep blood glucose levels optimal, increases the capability of a diabetic's innate immunity (Pal & Bhansali, 2020). As the primary defense against pathogenic infiltration and subsequent proliferation, it is vital to support the efforts of this system as much as possible. Secondly, hyperglycemia induces chronic inflammation (Pal & Bhansali, 2020), a condition known to deteriorate normal cellular function, damages the body, and leads to a host of further clinical issues.

Direct & Drossless: A diabetic needs to be closely monitored during the coronavirus pandemic. They are more likely to get the virus, and if they do, it can make their diabetes much worse.

However, there is a much better chance of a diabetic emerging from the pandemic healthy if they have control over their blood glucose, compared to one who often plays with high blood sugar. Controlling blood glucose boils down to regular exercise, a sensible diet, proper adherence to medication and consistent blood sugar monitoring.

I hope this was informative for you to take in! If you have any questions arise after reading my exposition of The Link Between Diabetes and Coronavirus, feel free to reach out and ask me! Most of all, I hope you took away knowledge that you can later use as wisdom for everyone's well-being.

Always Striving,
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