COVID-19 VACCINATION AND THE DEVELOPMENT OF TYPE 1 DIABETES

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BACKGROUND & PURPOSE

Type 1 Diabetes (T1D) is an autoimmune disease that leads to a destruction of insulin-producing pancreatic beta cells. Traditionally, T1D has a juvenile onset, though it can develop in older individuals. While cases of T1D have been steadily rising for decades, there has been a steep increase observed after the COVID-19 pandemic.[1]

The COVID-19 virus has been associated with new-onset T1D[2], and given the use of viral mRNA in the COVID-19 immunization, concern is raised for the plausibility of the vaccine itself also being a risk factor. This research aims to assess whether the COVID-19 vaccination has contributed to the increased incidence of new-onset Type 1 Diabetes observed post-pandemic.

PICOT

Are adults who received the COVID-19 vaccination at an increased risk of developing Type 1 Diabetes compared to those who did not receive the vaccine?

DESIGN & METHODS

Keywords: COVID-19 vaccination, Type 1 Diabetes Mellitus, SARS-CoV2

Inclusion: adults 18 years and older, vaccinated against or exposed to COVID-19, not previously diagnosed with diabetes. Articles could not be published any earlier than 2019, the full text must be available, and published in English.

Exclusion: those previously diagnosed with diabetes, the pediatric population, any articles published prior to 2019, and those not written in English.

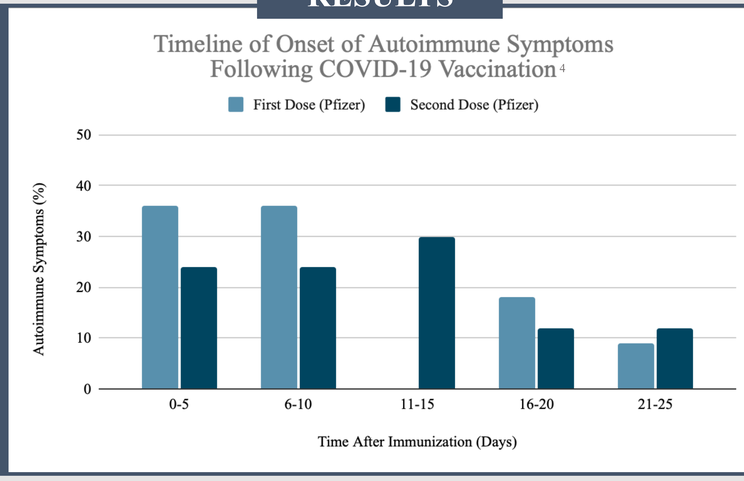
SUMMARY OF EVIDENCE SEARCH

DATABASE	YIELDED	REVIEWED	INCLUDED IN ANALYSIS
Summon	42	21	9
PubMed	100	14	4
Total:			13

SYNTHESIS OF EVIDENCE

Included Studies	• Matched (population-based) cohort • Meta-analysis • Retrospective cohort • Case studies
Primary Endpoints	Incidence of newly diagnosed T1D following COVID-19 infection and COVID-19 vaccination
Secondary Endpoints	Incidence of newly diagnosed diabetes (Type 1 or Type 2) and other autoimmune disease following COVID-19 infection and vaccination

RESULTS



At all ages, there was a statistically significant positive correlation between COVID-19 infection and risk of developing T1D and other autoimmune conditions.[3]

Those with more severe disease, especially those admitted to the ICU, had a higher risk of diabetes development.[2]

Majority of T1D cases following vaccination occurred after the 2nd dose of the vaccine (54%).[4]

RESOURCES

1.Giorda CB, Gnavi R, Tartaglino B, et al. Increased incidence of type 1 diabetes in 2 years of COVID-19 pandemic. *Acta Diabetol*. 2023;60(4):587-589. doi:10.1007/s00592-022-01986-w
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4.Alqatari S, Ismail M, Hasan M, et al. Emergence of Post COVID-19 Vaccine Autoimmune Diseases: A Single Center Study. *IDR*. 2023;16:1263-1278. doi:10.2147/IDR.S394602
5. Rajkumar V, Levine SN. Latent Autoimmune Diabetes. In: *StatPearls*. StatPearls Publishing; 2024. http://www.ncbi.nlm.nih.gov/books/NBK557897/
6.Chang R, Chen TYT, Wang SI, Hung YM, Chen HY, Wei CCJ. Risk of autoimmune diseases in patients with COVID-19: a retrospective cohort study. *eClinicalMedicine*. 2023;56. doi:10.1016/j.eclinm.2022.101783
7.It's good to feel bad after your COVID shot | National Emerging Infectious Diseases Laboratories.https://www.bu.edu/neidl/2023/12/its-good-to-feel-bad-after-your-covid-shot/#

BEST PRACTICE

DISCUSSION

- SARS-CoV-2 infection is associated with a higher risk of new-onset Type 1 Diabetes.[2, 3, 5] supported by the etiology that T1D has a genetic predisposition, especially in adults.[6]
- Prolonged inflammation in COVID-19 may trigger the immune system to create antibodies against virus antigens that share structural similarities with self-antigens, leading to a cross-reactive response against both.[4] This triggers the development of autoimmune disease.
- Adverse effects seen with the vaccine occur as a result of antibody production[7] as the body builds up immunity against the virus, which is the appropriate response to an antigen.
- If the immunization is designed appropriately to build immunity against the community strain of COVID-19, it provides a protective factor compared to the risk of developing T1D due to infection.

LIMITATIONS & FURTHER STUDY

There is a lack of long-term data due to COVID-19 and the vaccination being introduced in the past 5 years. COVID-19 was a global pandemic, which means there are very few individuals who neither became infected nor were vaccinated; therefore, the "control group" essentially disappeared. Finally, further research on Type 1 Diabetes including genetics, comorbidities, and the etiology can provide a deeper understanding of the disease.

CONCLUSION

Type 1 Diabetes has an autoimmune pathophysiology that can have an adulthood onset due to genetic predisposition. There has has been an increase in incidence since the COVID-19 pandemic which has an evident link to the virus. However, there is no direct correlation to the COVID-19 immunization triggering the development of Type 1 Diabetes.

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