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Original Clinical Case

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A Diabetic Specialist and An Unexpected Diagnosis: Genetic and Environmental Influence (Post-COVID) On Mother and Daughter with T1D

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Abstract:

Clinical Case: There are two patients: Patient number one is a mother (author) and patient number two is her (daughter's author).

Identification:

• **Patient 1** (Mother): A.P.F., female, 38 years old.
• History: Diagnosed with T1D at age 5, 33 years ago.
• Profession: Nurse, PhD in the area of Diabetes.
• **Patient 2** (Daughter): C.F, female, 8 years old.
• History: Diagnosed with T1D 2 years ago, at age 6.
• Family History: Mother with T1D since childhood.

About the mother

She has been a nurse for 17 years, working in the field of Diabetes, helping patients with T1D and their families.
In 2023, she was surprised with her daughter's diagnosis that was T1D, which was confirmed after the signs observed at home.

Introduction - the two patients' clinical history

In relation to patient number one - the mother APF: she was diagnosed with T1D in 1992, at the age of 5, after presenting the classic symptoms. Since then, she has been using intensive insulin therapy and continuous glycemic monitoring. Her experience as a patient motivated her to follow a career in the health field; therefore, she has been dedicating herself to the study and care of people with T1D for 17 years.
In relation to patient number two - the daughter CF: she began to present classic symptoms such as excessive thirst and fatigue at the age of 6, in 2023. The mother, attentive to the signs, refused to accept what she was observing; however, she decided to have her daughter do a capillary blood glucose test that resulted "HI". In great despair, the mother immediately took her daughter to the hospital for the diagnostic confirmation. Since then, the child has been on insulin therapy and monitoring. Besides that, she practices self-care very responsibly.
Laboratory tests in the hospital emergency:
Glycated hemoglobin 11% (DCCT)/ 103 mmol/mol (IFCC).
Average blood glucose: 287 mg/dL / 16 mmol/L
C-peptide: 0.3 ng/mL
Anti-GAD: greater than 2000 IU/mL

Discussion

The occurrence of T1D in mother and daughter raises the question of genetic predisposition to the disease. Although T1D is not considered a classic hereditary disease, genetics plays a fundamental role in propensity. The exact probability of a mother with T1D transmitting the disease to a child is complex and influenced by several genetic and environmental factors. However, we can present a general estimate: between 1% and 4% [1]. Genetics is involved in the propensity to T1D, mainly the Human Leukocyte Antigen genes located on chromosome 6. The inheritance of these genes can increase or decrease the risk [2,3].

The possible influence of post-COVID-19 in the development of T1D is an emerging and relevant research topic. Some studies have suggested a possible association between SARS-CoV-2 infection and an increase in the incidence of new cases of T1D [4,5]. The exact mechanisms of this relationship are still being investigated, but some hypotheses include: Molecular Mimicry, Immune Dysfunction and Direct Damage to Beta Cells (Frontiers in Endocrinology, 2025).

It is important to emphasize that this is an area of active research and further studies are needed to confirm and elucidate this possible link between COVID-19 and the development of T1D.

The tests showed that the child had COVID-19, and then had an allergic reaction throughout the abdomen, ruling out other causes and previous situations that led to the second condition being considered. On the other hand, the C-peptide test performed had a practically null result demonstrating a sudden and severe attack, which suggests the third condition [6,7]. It is important to emphasize that the child did not present the stage of Diabetic Ketoacidosis and did not experience a honeymoon phase.

Several epidemiological studies have globally demonstrated an increase in the incidence of type 1 diabetes in children and adolescents after COVID-19 pandemic. For example, incidence charts in countries like Germany show a significant peak in new cases in 2020 and 2021, which contrasts with the slower growth observed in pre-pandemic years [4]. This suggests that SARS-CoV-2 infection may have been an environmental trigger in genetically predisposed individuals. Another study from England and Wales also showed a growth of about 14% in 2020 and 27% in 2021. In the United States, research also shows a significant increase. They observed a 72% increase in the risk of diabetes for children who were infected compared to those who were not infected. These data from different regions of the world reinforce the hypothesis that SARS-CoV-2 virus may indeed act as a trigger for autoimmunity in genetically predisposed individuals.

Conclusion

This clinical case highlights some important points such as: the rarity of T1D cases involving mother and daughter with genetic predisposition; the possibility of post-COVID-19 as a trigger for a sudden and severe autoimmune attack; and the need for further research in this area as long as data have been showing a sharp increase in the incidence of T1D in children all over the world.

Conflicts of interest: No.

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