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POINT OF VIEW

Pediatric type 1 diabetes mellitus and COVID-19 infection: is there an association?

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Keywords:
Coronavirus Infections, Diabetes Mellitus, Type 1, Autoantibodies.

Abstract

A recent study from the UK, has described an apparent increase in new type 1 diabetes (T1DM) onset in children during COVID-19 pandemic. Both Brazil and USA (including our area of Houston, TX) have recently suffered from a sudden surge of this infection and we have noticed an association between the infection and 2 new cases of pediatric diabetes presenting in diabetes ketoacidosis. This association may become important in the future if the epidemiological data of T1DM shows an increased trend post the COVID-19 infection. It is also important to note that one patient was asymptomatic, this may be important to consider early screening and diagnosis to prevent the spread of infection.

Palavras-chave:
Coronavírus, Diabetes Mellitus Tipo 1, Autoanticorpos.

Resumo

Um estudo recente do Reino Unido descreveu um aparente aumento o novo início de diabetes melitus tipo 1 (DM1) em crianças durante a pandemia de COVID-19. Tanto o Brasil quanto os EUA (incluindo nossa área de Houston, TX) sofreram recentemente com um aumento repentino dessa infecção e observamos uma associação entre a infecção e 2 novos casos de diabetes pediátrico que se apresentam em cetoacidose por diabetes. Essa associação pode se tornar importante no futuro se os dados epidemiológicos do DM1 mostrarem uma tendência de aumento após a infecção pela COVID-19. Também é importante observar que um paciente era assintomático; isso pode ser importante a se considerar na triagem e no diagnóstico precoce para evitar a propagação da infecção.

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A recent report showed a significant increase in diabetic ketoacidosis and severe ketoacidosis at diabetes diagnosis in children and adolescents during the COVID-19 pandemic in Germany[1]. Another report from the United Kingdom has described an apparent increase in new onset T1DM in children during COVID-19 pandemic[2].

Since the World Health Organization (WHO) has declared the outbreak of the novel coronavirus disease (COVID-19) a pandemic, many questions were raised about risk of this viral infection in children with diabetes. Observational data suggest that older people and people with poorly controlled diabetes appear to be more vulnerable to becoming severely ill with this viral infection[3].

Children with diabetes may be more severely affected by any viral infection but reports from affected areas suggested that in most cases the coronavirus illness generally has a milder course in children[4] and there are no reliable data suggesting that children with well-controlled type 1 and 2 diabetes mellitus are at increased risk of getting infected or becoming very severely ill with coronavirus.

We report two cases of newly diagnosed type 1 diabetes presenting with pediatric diabetes ketoacidosis (DKA) and positive COVID-19 disease. One patient was asymptomatic while the second had respiratory symptoms. The first patient was a 15 -year-old Hispanic female presented with a new onset type 1 diabetes in diabetic ketoacidosis with a hemoglobin A1c of 15.4%. She had no history of fever or respiratory symptoms. Two days after admission, the patient's mother spiked high fever and developed cough. The patient remained asymptomatic. Testing for COVID-19 was positive in both. No other family members were reported to be COVID-19 positive.

The second case was an 11-year-old Asian male presented with new onset type 1 diabetes and diabetic ketoacidosis with a hemoglobin A1c of 9.6%. He had a history of fever and respiratory symptoms and tested positive for COVID-19 infection. No other family members were reported to be COVID-19 positive.

Similar to any viral infection, COVID-19 infection can be an inciting cause of DKA in children with pre-existing type 1 diabetes. Furthermore, the infection may be associated with new cases of pediatric diabetes presenting in DKA.

The relation between the COVID-19 infection and diabetes as an immune trigger or as a comorbid factor will become more understandable once multinational and international data were collected and published. Previous experience with SARS-associated coronavirus was associated with new cases of diabetes[5].

Several viral infections have been historically thought to contribute to auto-immunity and the progressive β-cell death that leads to the development of T1DM in children[6].

Considering the COVID-19 infection during high peaks in affected area is very important for children with new onset T1DM, not only from a pathogenic standpoint but also from practical management aspect to limit the transmission of the disease since some patients may not have the typical COVID-19 symptoms.

Future global epidemiological research is needed to evaluate the role of COVID-19 disease in the immunogenicity of T1DM and in its role of unmasking its presentation.

REFERENCES

1. Kamrath C, Mönkemöller K, Biester T, Rohrer TR, Warncke K, Hammersen J, et al. Ketoacidosis in children and adolescents with newly diagnosed type 1 diabetes during the COVID-19 pandemic in Germany. JAMA. 2020 Jul;324(8):801-4. DOI: https://doi.org/10.1001/jama.2020.13445
2. Unsworth R, Wallace S, Oliver NS, Yeung S, Kshirsagar A, Naidu H, et al. New onset type 1 diabetes in children during COVID-19: multicenter regional findings in the U.K. Diabetes Care. 2020 Nov;43(11):e170-e1. DOI: https://doi.org/10.2337/dc20-1551
3. Hussain A, Bhowmik B, Moreira NCV. COVID-19 and diabetes: knowledge in progress. Diabetes Res Clin Pract. 2020 Apr;162:108142. DOI: https://doi.org/10.1016/j.diabres.2020.108142
4. Lu X, Zhang L, Du H, Zhang J, Li YY, Qu J, et al. SARS-CoV-2 infection in children. N Engl J Med. 2020 Apr;382(17):1663-5. DOI: http://www.nejm.org/doi/full/10.1056/NEJMc2005073
5. Yang JK, Lin SS, Ji XJ, Guo LM. Binding of SARS coronavirus to its receptor damages islets and causes acute diabetes. Acta Diabetol. 2010 Mar;47(3):193-9. DOI: https://doi.org/10.1007/s00592-009-0109-4
6. Beeck AO, Eizirik DL. Viral infections in type 1 diabetes mellitus – why the β cells?. Nat Rev Endocrinol. 2016 Mar;12(5):263-73. DOI: https://doi.org/10.1038/nrendo.2016.30