New Onset Type-1 Diabetes Mellitus in a Toddler with SARS-CoV-2 Infection Presenting in Diabetic Ketoacidosis: A Case Report

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ABSTRACT

Introduction: Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), though mostly sparing the lungs in children, has been found to affect other organs including the endocrine system [1, 2]. Diabetes mellitus (DM) from SARS-CoV-2 infection occurs through direct negative effects of the virus on beta cell function, [3, 4] and may rapidly progress to complications such as diabetic ketoacidosis (DKA) which can be potentially fatal [3]. We present a case of new-onset type 1 DM presenting as DKA in a toddler with SARS-CoV-2 infection.

Case presentation: A 3-year-old previously healthy male presented with 4 days history of fever and generalized body weakness, and “deep breathing” of 1 day. Review of systems was notable for increased thirst and urination, nausea, vomiting, fatigue, and visible weight loss noted in the last 4 days. Initial investigations done showed elevated blood glucose (582 mg/dL), ketonuria (2+ or 80 mg/dL), increased anion gap metabolic acidosis (pH 6.95, bicarbonate <6 mEq/L, lactate 2.7 mmol/L, anion gap 23), and positive SARS-CoV-2 polymerase chain reaction (Table 1). He was immediately commenced on intravenous fluids and insulin with progressive improvement. Subsequent laboratory findings include elevated HbA1c (10.0%), low insulin and low C-peptide (<15 mIU/L and <0.1 ng/mL respectively) suggestive of type 1 DM. Antibodies to insulin and glutamic acid decarboxylase (GAD) 65 were within normal range (<0.4 U/mL and <5 IU/mL respectively). Screening for celiac disease and thyroid disorders were also within normal limits. He remained otherwise asymptomatic with other coronavirus disease-2019 (COVID-19) symptoms and was discharged on hospital day 6 on subcutaneous insulin.

Conclusion: The association between COVID-19 and new-onset type 1 diabetes mellitus (T1DM) is becoming increasingly prevalent. The case highlights the possibility of SARS-CoV-2 acting as an infectious precipitant for T1DM and DKA. Although the presence of multiple autoantibodies greatly increases the probability for T1DM with about 96% of affected individuals being positive for at least one of the autoantibodies, the index case did not have autoantibodies suggesting a different mechanism of pancreatic beta cell destruction. Since children have been mostly spared the respiratory symptoms in acute COVID, it is important to remember that other organ systems can be affected distinct from the post-infectious multi-inflammatory syndrome. We therefore recommend that caregivers, parents, and medical professionals should have a high index of suspicion so that diagnosis can be early and DKA potentially prevented.
COMPETING INTERESTS
The authors have no competing interests to declare.

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