COVID-19 infection-induced type one Diabetes Mellitus and Diabetic Ketoacidosis

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Author's Contribution
1 Conception of study
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Abstract

A 63-year-old female patient presented with a one-week history of reduced appetite, weakness, nausea, polyuria, and occasional vomiting on a background of recurrent urinary tract infection and hypothyroidism. She appeared lethargic and dehydrated. The arterial blood gas showed a picture of diabetic ketoacidosis (DKA) which was treated according to the protocol. Viral polymerase chain reaction (PCR) for COVID-19 was positive. The diagnosis of new-onset type one diabetes is made based on specific antibodies test. Computerized Tomography (CT) of the abdomen excluded pancreatic cancer as a cause of new-onset diabetes. Hence, the patient was labelled as type one diabetes mellitus induced by the COVID-19 virus. She was treated accordingly and sent home on insulin.

Keywords: COVID-19, Diabetes Mellitus, Diabetic Ketoacidosis.
Introduction

The data obtained so far after the onset of the COVID-19 pandemic showed that the risk of contracting the virus by patients with diabetes is the same as the patients with non-diabetes. However, the patients with diabetes are at risk of increased complications especially diabetic ketoacidosis thus increasing the mortality rate. Certain cases of new-onset diabetes in patients have been published. It is still unclear how the COVID-19 virus causes new-onset diabetes and its complications. It is believed that the likely cause is increased expression of angiotensin-converting enzyme 2 (ACE-2) receptor which acts as an entry point of COVID-19 virus into the pancreatic cells leading to the destruction and causing new-onset diabetes. However, this theory still needs further research.

Materials and Methods

A 63 years old female patient presented to the accident and emergency department with complaints of reduced appetite, weakness, nausea, polyuria, and occasional vomiting for a week. The background history included recurrent urinary tract infections and hypothyroidism. She was taking Levothyroxine 50 microgram once a day at the time of presentation; was self-employed, non-smoker, and consumed alcohol socially (4-6 units per week). There was no significant family history of note.

Vitals measurement showed blood pressure of 103/76 mmHg, a pulse of 92 beats per minute, respiratory rate of 17 per minute, oxygen saturation on room air 98%, and temperature of 37.9 C.

On general examination, the patient appeared dehydrated and lethargic, and mildly agitated. Systemic examination showed normal air entry in both lungs, normal heart sounds, and audible bowel sounds.

Arterial blood gas (ABG) was done upon arrival which showed pH 7.08, pO2 14.2, pCO2 3.9, HCO3 6.3, glucose 37.5, and lactate 2.7; blood ketones of 6.7 were recorded. Noticing diabetic ketoacidosis picture, the patient was immediately commenced on DKA protocol. Serial ABGs were done and electrolytes were checked as per protocol. She recovered out of DKA within sixteen hours.

Results

Investigations: Laboratory investigations showed C-reactive protein 15, White cell count 15, Sodium 133, Potassium 4.4, Hemoglobin 126 g/dl, Creatinine 151, Urea 10.4, and AKI stage 2. Urine dip showed negative blood, nitrites, and leukocytes. Hba1c was 10.5%. The screening test for SARS-CoV-2 (COVID-19) returned positive. Chest x-ray report revealed no abnormal findings. An electrocardiogram showed sinus rhythm. There was a suspicion of pancreatic cancer as a likely cause of new-onset diabetes. So CT scan of the abdomen was arranged which did not show any pancreatic and peripancreatic lesions.

Antibodies tests for type 1 diabetes mellitus showed Glutamic Acid Decarboxylase antibody level of 57 U/mL (0-10.9U/mL), Insulinoma associated-2 antibody level of 3461U/mL (0-7.99U/mL) and Zinc transporter 8 antibody level of 1443U/mL (0-9.99U/mL). The antibodies results were consistent with type 1 diabetes mellitus and COVID-19 infection was considered as the likely cause given normal CT pancreas.

Differential diagnosis: New-onset type one diabetes mellitus in middle age patients can be due to pancreatic cancer, recent pancreatic trauma or surgery, and infection. Our patient has no recent abdominal trauma or surgery. The risk of alcoholic-induced pancreatic damage was low due to non-heavy intake. Pancreatic cancer was ruled out due to normal CT scan findings. In the absence of other causes, COVID-19 infection was considered a likely cause.

Treatment: DKA protocol was treated according to the protocol. Electrolytes and ketones were checked regularly and the patient was rehydrated. An opinion from consultant endocrinology was taken due to new-onset diabetes mellitus and the patient was initiated on insulin. All necessary guidance about insulin and diabetes mellitus was given to the patient. No specific treatment was given for COVID-19 infection.

Outcome and follow-up: The patient was sent home after stabilization. A follow-up appointment was arranged in the diabetes center to monitor the diabetes control.

Discussion

COVID-19 infection has a wide spectrum of complications. Patients with diabetes are at the same risk of contracting the virus as patients with no
Conclusion

1. The case shows the likely association between COVID-19 infection and new-onset type 1 diabetes mellitus.
2. COVID-19 infection can precipitate diabetic ketoacidosis in a patient with diabetes.

References