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Marked hyperglycemia and ketosis in a non-obese patient with new onset diabetes and very mild COVID-19 symptoms: A case report

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1. Background

Diabetes Ketoacidosis (DKA) is known to develop in patients of Type 2 diabetes mellitus (T2DM); triggering factors being stress, trauma, infections (e.g., respiratory tract infection, urinary tract infection) [1]. Infection with SARs-Co-V19 (COVID-19) infection has been linked to new onset of diabetes. Reason for development of hyperglycemia and DKA following COVID-19 is under research. Few cases of DKA precipitated by COVID-19 infection has been reported globally and from India[2].

Here we report a case of marked hyperglycemia and ketosis in a new onset diabetes with mild COVID-19 symptoms.

2. Case report

A 41-year-old male was seen in our outpatient department for marked hyperglycemia and 6 kg weight loss over last 1 month. He gave history of having mild fever (~99 °C) lasting for 2 days, about 3 weeks back and was tested positive for COVID-19 by Real Time Polymerase Chain Reaction (RT-PCR). During the infection, his routine biochemical tests showed marked hyperglycemia; fasting blood glucose, 246mg/dl, postprandial blood glucose, 505 mg/dl, HbA1C, 14.9%, and urine ketones, moderate (50 mg/dl). He had mild osmotic symptoms during fever. Patient did not have any previous history and no family history of diabetes. Further, D-Dimer level was 0.43mg/L FEU (normal <0.50 mg/L FEU). Chest CT scan or other blood tests (IL-6, serum ferritin) were not done because of mild nature of illness. At no time was his oxygen saturation was below 97%. No specific therapy (e.g., remdesevir, corticosteroids) for COVID-19 was given. He was advised home isolation. His temperature became normal after two days. After 14 days of home isolation his RT-PCR for COVID-19 was negative.

For diabetes he was initially started on metformin (1000mg) and glimepiride (2mg) daily. When he visited us, he was asymptomatic. His weight was 53.9 Kg, BMI, 21.3Kg/m^2, and waist circumference was 79cm. There was no acanthosis nigricans or xanthelasma. On investigation his fasting C-peptide level was 1.44ng/mL (normal 0.81–3.85 ng/mL). We added pioglitazone and continued glimepiride and metformin. Patient was reviewed after 1 week when his fasting blood glucose was 108mg/dl and post-prandial blood glucose was 103mg/dl. His glimepiride was stopped, and metformin was reduced.

3. Discussion

Patients with COVID-19 who develop new-onset hyperglycemia usually have severe disease. Most cases of hyperglycemia following COVID-19 are without ketosis or ketoacidosis according to recently published data [3]. The likely causes are effects of severe sepsis ("cytokine storm"), corticosteroids and stress. Direct damage due to COVID-19 has been shown [4,5]. It is important to note that type 1 diabetes has been reported in children following severe COVID-19 [6].

In a case series recently published from India, it was seen that three patients who presented with new-onset diabetes ketoacidosis initially required insulin for treatment [2]. These patients had severe COVID-19 with high levels of inflammatory markers, with pneumonia and cerebrovascular accident, and were hospitalised for 3 weeks. After initial treatment with insulin, hyperglycemia was

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well controlled on oral anti-hyperglycaemic agents alone [7].

Our patient is different from the reported cases since he developed very mild symptoms with no hypoxia or complications of COVID-19 infection. His blood D-Dimer value was normal. He quickly responded to oral anti-hyperglycaemic agents without addition of insulin. In difference all, except a few, reported patients with new-onset diabetes and ketosis/ketoacidosis had severe COVID-19 infection with presence of markedly elevated inflammatory markers [7–9] On review of literature only three cases, similar to our case, have been reported previously [10]. All the three cases had mild symptoms of COVID-19. Two cases were admitted and treated for DKA and subsequently discharged on insulin, and third case had ketouria and was given oral metformin. The latter case was similar to the case described by us here.

In our patient the cause of marked hyperglycemia is not clear. It is certainly not due to cytokines storm or effect of any drug like corticosteroids. However a brief direct attack of SARS-COV2 on beta cells of pancreas, temporarily decreasing insulin secretion, cannot be entirely ruled out.

Declaration of competing interest

The authors declare 'no conflict of interest' regarding this particular article.

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