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Letter to Editors

Ketonuria with or without ketoacidosis as the presenting manifestation of SARS-CoV-2 (COVID-19) among uncontrolled type 2 diabetic patients

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ABSTRACT

We present three diabetic patients cases presented with kentonuria as the presenting manifestation of SARS-CoV-2 infection.

Introduction

We hereby present the data of 3 patients presented to our OPD and were admitted as diabetic ketoacidosis (DKA) and 2–3 days later they developed manifestations suggestive of COVID-19 and proved by swabbing as positive cases.

Case 1: A 42-year-old male patient who was not fully compliant with oral diabetic medicines over last one month, presented for renewal of monthly medicine without any clinical manifestations. A call from lab about panic RBS value (Table 1) and positive ketones received. Patient admitted as DKA, the 2nd day after admission he developed fever, and his O_2 saturation was began to drop. Chest auscultation and chest X ray were unremarkable and hence chest CT scan was requested (Fig. 1) and showed picture suggestive of mild-moderate COVID-19, swabbing was done and came positive

Case 2: A 51-year-old male, presented by dizziness over last 2–3 days and when examined found to have high RBS and ketonuria, and hence admitted as DKA, and was acidotic (PH 7). Second day, O_2 saturation dropped and the patient was afebrile (Table 1). Chest X ray showed; bilateral lung infiltration, swabbing was done and came positive for SARS-CoV-2.

Case 3: A 62-year-old male patient who was not compliant with his medicines over the last 2 months, presented for renewal of medicine without any clinical manifestations, found to have panic RBS measurement, and was positive for urine ketones. Patient admitted as DKA, on the 3rd day he began to report shortness of breath (SOB) and low-grade fever. Examination showed low-grade fever, bilateral crepitations, hypoxemia, swabbing was done and was positive for SARS-CoV-2. Patient later deteriorated with severe hypoxemia and connected to mechanical ventilator and unfortunately passed out despite of the correction of the DKA.

Common feature of cases: All the three cases share some common features. All were known type 2 diabetic non-obese males with regular daily activity and without fasting. Not all were compliant with their medications over the last 1–2 months; all were free at the time of presentation from fever, cough, SOB, or constitutional manifestations. Co-morbidities; all the three patients were also hypertensive and dyslipidemics. The most important common feature was the development of fever and hypoxemia by the 2nd–3rd day of hospital admission (Table 1) which embarked us to investigate for SARS-CoV-2.

Discussion

The trials to predict the severity of COVID-19 patients from different urine parameters has been studied among patients from the SARS-CoV-2 first focus in Wuhan, China. Urine occult blood and proteinuria were higher in COVID-19 patients than in healthy controls. Urine ketones – among others – was not found to predict the severity in COVID-19 infection [1]. However, other reports documented higher frequency of ketoacidosis among diabetic patients infected with SARS-CoV-2 [2] with variable degrees of severity. In fact, different co-morbidities especially diabetes increase morbidity and mortality among COVID-19 patients [3].

The cases presented here deliver many important messages. First, patients with SARS-CoV-2 may lack all or any of the well-known manifestations as fever and cough; that are listed in the triage checklist of the case definition protocols. Second, the importance of continuous tight control of diabetes. All our cases were missed from the regular monthly diabetic follow up and furthermore they were not compliant with medicines. Treating physicians and pharmacists should ensure regular dispense of diabetic medicines to well controlled patients while non-controlled patients should be reached and controlled [4]. In fact, several reports showed not only worsening of diabetic control with SARS-CoV-2 infection, but also possible SARS-CoV-2 induced diabetes [5]. This may not be strange due to the widespread presentation of the ACE 2 receptors in virtually all organs including the pancreas, which represent the target receptor of the virus to enter the cells [6]. Third, and probably the unique finding of this report is that in areas with high SARS-CoV-2 transmission any diabetic patient with urinary ketones should be meticulously examined and if needed also investigated for COVID-19 even if lacking the well-known SARS-COV2 manifestations. Given the global high prevalence of diabetes, many patients with this presentation would be discovered [4]. Why we should focus such cases is not only linked to the morbidity and mortality of patients, but also to the concern about spread of infection outside and inside the hospital particularly most of those patients are treated in the ICU with possible contact with many other immunocompromised patients putting them under a real threat. Fourth, the treating team managing patients with

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Table 1
Data of the presented cases.

	Patient 1	Patient 2	Patient 3
RBS at admission	491 mg	592 mg	587
Ketones at admission	+	+ + +	+
Temperature 2nd day	38.3 °C	37 °C	38.3 °C
Temperature 3rd day	39.7 °C	37 °C	38.5 °C
O2% 2nd day	97	94	90
O2% 3rd day	93	92	85
Duration of diabetes/year	4	10	15
Body Mass Index (kg/m^2)	27	21	20
Hemoglobin A1C (%)	8.1	7.8	8.5

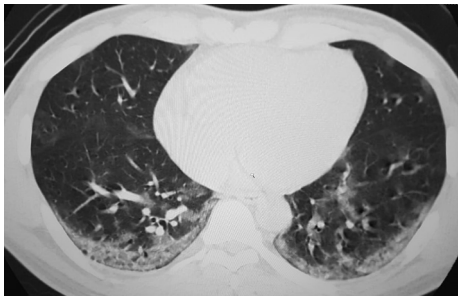

Fig. 1. CT scan showing mild to moderate lung infiltration suggestive of COVID-19.

DKA should increase their level of suspicion during this period of exponential spread of SARS-CoV-2 around the globe.

We realize that, our hypothesis that ketonuria as the presenting manifestations of SARS-CoV-2 among diabetics may not be one hundred percent convincing because uncontrolled diabetes may result in ketonuria, but it is known that infections are one of the precipitating factors for DKA among diabetic patients. Hence the clinicians should think in this silent SARS-COV infection in this high-risk category particularly when they seems uncontrolled and had ketonuria.

Conflict of interest

None.

Funding

None.

Ethical consideration

A written informed consent was obtained from the patients or their first degree relatives.

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Mohamed H Emara[a,b,*], Usama Mazid[c,b], Mohammed Ali Atta[d,e], Sahar Elshahat[f,g], Aya Mohammed Mahros[a]
[a] *Hepatology, Gastroenterology and Infectious Diseases Department, Faculty of Medicine, Kafrelshiekh University, KAFR ELSHIEKH, Egypt*
[b] *Department of Medicine, Alyousef Hospital, Alkhobar, KSA*
[c] *Tanta Hospital for Tropical Diseases, Tanta, Egypt*
[d] *Department of Radiology, Al-Mahalla General Hospital, Almehala, Egypt*
[e] *Department of Radiology, Alyousef Hospital, Alkhobar, KSA*
[f] *Clinical Pathology Department, Alazhar University,(Faculty of Medicine for Girls), Alzahraa Hospital, Cairo, Egypt*
[g] *Department of Clinical Pathology, Alyousef Hospital, Alkhobar, KSA*
E-mail addresses: emara_20007@yahoo.com, mohamed_emara@med.kfs.edu.e (M.H. Emara).

[*] Corresponding author at: Hepatology, Gastroenterology and Infectious Diseases Department, Faculty of Medicine, Kafrelshiekh University, KAFR ELSHIEKH, 33516, Egypt.