Pneumomediastinum Complicating Diabetic Ketoacidosis in Type 1 Diabetes Patient with COV-19 Reinfection: A Case Report

Sir,

Spontaneous pneumomediastinum is a rare complication, characterized by the presence of air in the mediastinum that is not related to trauma, surgery, or other medical procedures.[1] It is thought to be caused by an alveolar rupture secondary to factors leading to a sudden increase in intrathoracic pressure, such as coughing, sneezing, and vomiting. These factors are often present during DKA but also during SARS-COV 19 infection.[2]

We describe a case of a pneumomediastinum in a patient with severe DKA and SARS-COV19 infection.

Case Presentation

An 18-year-old woman was diagnosed with type-1 diabetes by two elevated fasting blood glucose (220 and 190 mg/dl) and HbA1c at 7.5%, established by positive anti GAD65 and anti IA2 antibodies in October 2020 following a first confirmed SARS-CoV 2. This was a severe acute respiratory infection with SpO2 of <94% in ambient air and lung infiltration of >50% on the computed tomography (CT) scan of the chest; CORAD score of chest CT was 6. The patient completed a course of cefotaxime, ciprofloxacin, dexamethasone, and enoxaparin. In January 2021, the patient presented to the emergency department with diabetic ketoacidosis secondary to covid-19 reinfection (confirmed by PCR test). The clinical examination showed a lethargic patient with generalized weakness, confusion, incoercible vomiting, and signs of dehydration. She was hemodynamically stable with a blood pressure of 100/60 mm Hg and a heart rate of 90 b/min. She was tachypneic with a respiratory rate of 41/minute and her oxygen saturation was 99% in ambient air. There was no cough or fever noted.

Laboratory tests revealed metabolic acidosis with venous blood pH at 7.10, bicarbonate of 4.7 mmol/l, hyperglycemia of 380 mg/dl, hypokalemia of 3 meq/l. Urinalysis was positive for ketones (3+). Her leukocyte count was 7.75 × 10^9/l with neutrophils at 3.26 × 10^9/l, and a lymphocytes count of 3.57 × 10^9/l, an elevated C-reactive protein at 4.4 mg/dl, and normal liver and kidney functions [Table 1].

Table 1: Results of the biological exams

Variables	Value	Range
Hematological exam		
Leukocyte (10^9/l)	7.55	4-10
Lymphocyte (10^9)	3.57	1.5-4
Hemoglobin (g/l)	91	120-150
Platelets (10^9/l)	250	150-400
Coagulation tests		
APTT (seconds)	20	25-35
PT (%)	100	70-100
D-dimer (µg/ml)	6.46	<0.5
Fibrinogen (mg/dl)	327	150-350
Biochemical exams		
GPT (u/l)	70	10-35
GOT (u/l)	66	10-35
Urea (mg/dl)	15	10-50
Serum creatinine (mg/dl)	0.6	0.6-1.2
Fasting blood sugar (mg/dl)	380	70-100
ALP (U/l)	43	<125
LDH (U/l)	313	240-480
CRP (mg/dl)	4.4	<0.6
pH	7.10	7.38-7.42
PCO2 (mm Hg)	15	35-45
HCO3 (mmol/l)	4.7	22-26
Lactate level (mmol/l)	0.62	0.5-1
NA+ (meq/l)	138	135-145
K+ (meq/l)	3	3.5-5
CL (meq/l)	102	98-105

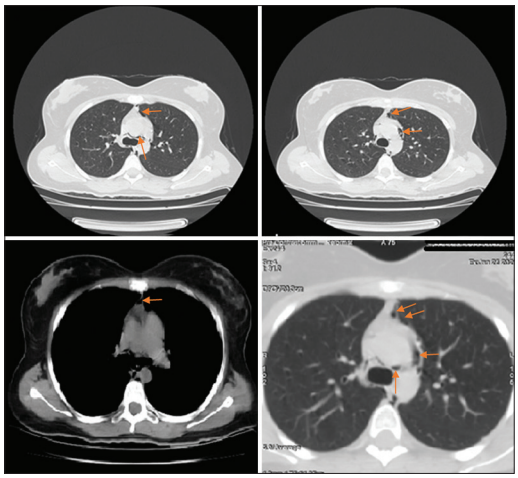

Figure 1: Axial lung window views of chest computed tomography scans depicting spontaneous right pneumomediastinum and the presence of air extending to the neck

Non-contrast chest CT showed the presence of air in the mediastinum extending to the neck, associated with densification of the mediastinal fat without pulmonary parenchymal lesions [Figure 1].

The patient was admitted to intensive care. Intravenous insulin infusion and fluid resuscitation were initiated with close monitoring of electrolyte homeostasis. Her condition progressively improved over the following days and was transferred to the diabetes clinic. She was discharged after few days on a multiple daily insulin injection regimen.

Discussion

Hyperglycemia and DKA are the most common complications in type-1 diabetes patients with COVID-19. In the US multicenter study, Ebekozien *et al*. showed that in 64 patients with type-1 diabetes who have suspected or confirmed COVID-19 infection, more than 50% of the cases had hyperglycemia and nearly one-third had DKA.[3] The diagnosis of DKA in our case was late, leading to severe acidosis. COVID-19 symptoms can mask the onset of DKA, delaying the diagnosis.[4] The occurrence of pneumomediastinum in DKA is rare, and few cases have been reported in the literature.[5] Except for age, our case differs from the typical presentation of patients with pneumomediastinum complicating DKA who are often young (in their twenties), males with large musculature that can create significant variations in alveolar pressure, leading to an increased risk of alveolar rupture.[5]

The absence of respiratory signs and normal lung CT scan led to the suspicion that vomiting was the main factor in the development of pneumomediastinum in our patient, resulting in an increase in intrathoracic pressure of 20–30 mm Hg, sufficient to cause alveolar rupture.[2]

Conclusion

Spontaneous pneumomediastinum is a rare complication of DKA complicating COVID-19 infection. Its diagnosis should be considered in case of chest pain and breathing difficulties in patients with type-1 diabetes and DKA.

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Conflicts of interest

There are no conflicts of interest.

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