

Case Report

Uncontrolled diabetes leading to pneumonia, diabetic ketoacidosis and refractory shock: a vicious cycle

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ABSTRACT

Diabetes mellitus (DM) puts people at risk of infections and metabolic crises diabetic ketoacidosis (DKA). Another common precipitant is pneumonia, it has the power to aggravate hemodynamic instability by causing systemic inflammation, and acidosis. A 52-year-old male who has had a history of poorly controlled type 2 DM presented with fever, cough, breathlessness, and altered sensorium in the last three days. Patient was febrile (38.6° C), tachycardic (124 beats/min), hypotensive (84/56 mmHg), tachypneic (32 breaths/min), and hypoxic (SpO₂ 86% on room air) at the time of admission. Auscultation of the chest showed signs of crepitation in the lower right lung fields. Incidents revealed random blood glucose 486 mg/dl, arterial pH 7.05, HCO₃⁻ 8 mmol/L, PaCO₂ 18 mmHg and presence of serum ketones, which is typical of DKA. The X-ray of the chest showed right-lower-lobe consolidation. Despite the fluid resuscitation, insulin infusion, and inotropic support, hypotension prevailed until the restoration of acidosis. Optimization of antibiotics was by testing of external procalcitonin. Upon stabilization of the pH, the patient was discharged on day 9 with strict glycemic control recommendations. The combination of infection, DKA, and shock is highly pathophysiological interactive as evidenced in this case. Metabolic acidosis needs to be corrected to reinstate the vascular responsiveness. The ability to adjust to changing circumstances and make clinical decisions is crucial to the provision of the best care in resource-restricted settings.

Keywords: Diabetes mellitus, Diabetic ketoacidosis, Pneumonia, Refractory shock, Acidosis

INTRODUCTION

Diabetes mellitus (DM) makes a person highly vulnerable to infections and metabolic abnormalities like DKA. DKA is precipitated by infections especially pneumonia and is a significant cause of morbidity and mortality.¹ Acidosis in DKA impairs the contractility and sensitivity of the myocardium to catecholamine, resulting in the development of hypotension, which may not disappear after normal resuscitation procedures.²

In recent literature, it is pointed out that rapid correction of acidosis, and control of infection, enhances outcome of patients coming with combined septic and metabolic shock.³ More recent global reviews (2015-2025) have also reiterated that timely resource constraints and delayed instigation of diagnostics intervention (e.g., unavailable biomarkers e.g. procalcitonin) can impede prompt management.⁴ This study reports a case of pneumonia, manifesting in DKA and refractory shock in a 52-year-old man with uncontrolled T2DM, which was controlled successfully with vigorous acidosis therapy and observational diagnostics in a situation of insufficient resources.

CASE REPORT

A 52-year-old male having 10 years history of type 2 DM presented with fever, cough, breathlessness, and confusion for three days.

On examination, temperature was 38.6°C, heart rate-124 bpm, blood pressure was 84/56 mmHg, respiratory rate-32 breaths/min and SpO₂ was 86% (room air).

The patient was dehydrated and sleepy (GCS 10/15). Auscultation of the chest identified coarse right lower lung field.

Investigations

Random blood glucose was 486 mg/dl. ABG: pH 7.05, HCO₃⁻ 8 mmol/l, PaCO₂ 18 mmHg, anion gap 28, high-anion-gap metabolic acidosis. Serum ketones were positive. WBC count-16.8×10⁹/l, creatinine-1.9 mg/dl and chest X-ray consolidation of the right lower lobe.

Management

Diagnosis

Community pneumonia occurring with development of DKA and septic shock.

The treatment involved intravenous isotonic saline, continuous insulin infusion, broad-spectrum antibiotics (piperacillin-tazobactam + azithromycin), and norepinephrine for hypotension. Despite aggressive resuscitation, the state of hypotension did not improve until pH returned to normal (~7.35). The external procalcitonin test was helpful in decreasing antibiotic coverage. Hemodynamics of the patient improved, inotropes were stopped, and metabolic regulation was obtained. Patient was discharged after 9 days of counseling on strict glycemic control and follow up.

DISCUSSION

The case in point represents an example of a complex interplay between infection, metabolic acidosis, and shock in diabetic patients. DKA was precipitated by pneumonia, and acidosis, which was caused by it, led to refractory hypotension. Acidosis slows down the contractility of the myocardium and the tone of the vascular system and makes catecholamines less effective.

The latest research (2015-2025) focuses on the need to promptly identify and address the acid-base disruptions to reestablish a normal hemodynamic state.⁵ Jozwiak et al showed that clinicians use the pH value of <7.2 as one of their significant reasons to admit a patient to the ICU in DKA, reflecting the degree of acidosis severity.⁶ On the same note, Sokwalla et al indicated infections as triggers in >40 percent of DKA cases in adults in resource-limited

areas.⁷ The historic works of Umpierrez et al still affect guidelines on fluid and insulin therapy up to date.⁸

The classical scenario of infection, which led to DKA, DKA caused acidosis, and acidosis worsened shock was exhibited by patients. Addition of pH corrective prioritized this cycle and returned vascular uprisings. The recent reviews also back the application of biomarkers, such as procalcitonin, to inform antibiotic stewardship in the cases of diabetic patients with sepsis.¹⁰⁻¹² In environments where resources are limited, external organization of such tests may have a lot of influence on the direction and treatment outcome.

CONCLUSION

Patients with uncontrolled diabetes may have pneumonia that triggered a DKA and refractory shock. The correction of acidosis of acidosis is crucial in the recovery of vascular responsiveness to attain hemodynamic stability. The case underlines the importance of clinical resourcefulness and an immediate response to acid-base in the low-resource environment, which can change outcomes.

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