



A Case Report: Diabetic Ketoacidosis in Patient with type 1 Diabetes Mellitus with Complication Septic Shock and AKI Stage III on HD Triggered by Perianal Abscess

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ABSTRACT

Introduction. Diabetic ketoacidosis (DKA) is an acute, life-threatening complication in diabetes mellitus. Infection is a common precipitating cause of diabetic ketoacidosis (DKA) in known diabetic patient, and diabetic ketoacidosis (DKA) often presents as the first symptom of an undiagnosed diabetes. Diabetic ketoacidosis (DKA) is diagnosed with combination of hyperglycaemia, acidosis metabolic and ketonuria.

Case Presentation. A 27 years old male patient, admitted to Intensive Care Unit with decrease level of consciousness (GCS 3), he was intubated and present with respiratory distress, metabolic acidosis, high glucose level, ketonuria with renal failure as a target organ. Patient known has perianal abscess as a triggered of diabetic ketoacidosis (DKA), turn into septic shock and underwent debridement surgery to source control the infection. The patient was treated in intensive care unit for 9 days, and sent to ward with GCS 15 and no sequelae of organ failure.

The treatment of diabetic ketoacidosis (DKA) should include correcting the often substantial hypovolemia, the hyperglycemia, electrolyte imbalance and the triggering factor of diabetic ketoacidosis (DKA). **Conclusion.** Prompt surgical intervention, antibacterial therapy, rapid restoration of glycemic control are crucial to prevent mortality in diabetes mellitus patients complicated with abscess.

Keywords. Diabetic Ketoacidosis, Septic Shock, Adult Respiratory Distress Syndrome, Ketosis, Hyperglycemia.

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Introduction

Diabetic ketoacidosis (DKA) is an acute, life-threatening complication in diabetes mellitus. Diabetic ketoacidosis (DKA) results from severe insulin deficiency and mainly occurs in type 1 diabetes. Infection is a common precipitating cause of diabetic ketoacidosis (DKA) in known diabetic patient, and diabetic ketoacidosis (DKA) often presents as the first symptom of an undiagnosed diabetes. Vomiting, nausea, deep gasping breathing (Kussmaul respiration), pronounced thirst, malaise and general weakness are typical symptoms of diabetic ketoacidosis (DKA). Patients may also present with altered consciousness, disorientation, confusion or occasionally coma when the condition is severe. Diabetic ketoacidosis (DKA) is diagnosed with a combination of hyperglycaemia, metabolic acidosis and ketonuria. The treatment of diabetic ketoacidosis (DKA) should include correcting the often substantial hypovolemia, the hyperglycemia, and electrolyte imbalance.

Case Presentation

A 27-year-old male patient, admitted to Intensive Care Unit with a decreased level of consciousness (GCS 3), he was intubated and presented with respiratory distress with a respiratory rate of 44x/min, high glucose level (446 mg/dl), ketonuria and an increase in urea (282 mg/dl) and creatinine level (8,72 mg/dl). The patient was found to have a metabolic acidosis with a pH of 7.245, HCO_3^- 6,8 mEq/L, pO_2 104 mmHg and pCO_2 15,6 mmHg. Patient diagnosed with type 1 diabetes mellitus since 2 months ago and treated with a combination of long and rapid acting subcutaneous insulin. In ICU, patient known to have a perianal abscess, and blood pressure was decreased to 84/42 mmHg, heart rate 123 beats/min treated with norepinephrine 0,05 – 0,5 mcg/kgBB/min and underwent debridement surgery to source control the infection. Patient also had haemodialysis to treat the acute kidney injury (AKI). The blood glucose was successfully controlled on day 4 of treatment in ICU and the level of consciousness was increased. Patient was extubated after attainment of normal hemodynamic, glucose level and adequate power and consciousness. Renal function returned to normal and patient sent to ward after 9 days of treatment in ICU with GCS 15 and discharged 3 days later.

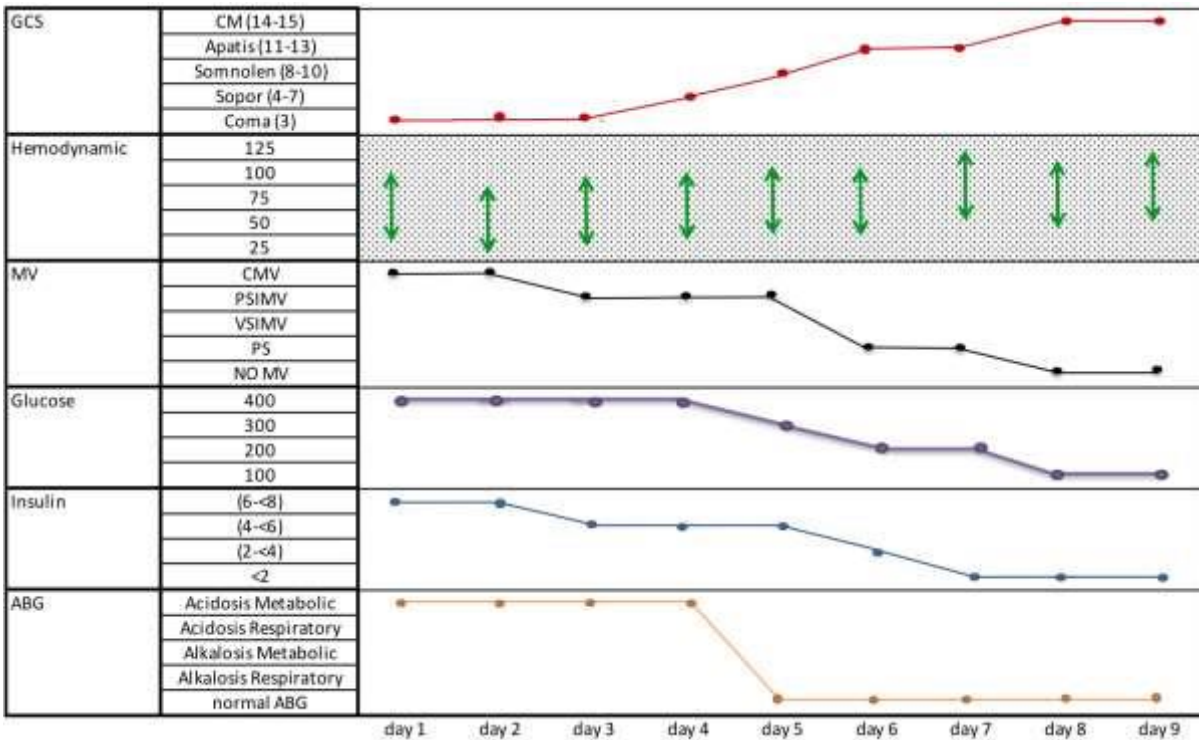


Figure 1. Patient progress during treatment in Intensive Care Unit. GCS, Glasgow Coma Scale; MV, Mechanical Ventilator; ABG, Arterial Blood Gas.

Discussion

Diabetic ketoacidosis (DKA) is a complication of decompensated diabetes mellitus. The signs of diabetic ketoacidosis (DKA) are primarily the result of abnormalities in carbohydrate and fat metabolism. Episodes of diabetic ketoacidosis (DKA) occur more commonly in patients with type 1 diabetes mellitus and are precipitated by infection or acute illness. Patients with diabetes mellitus are susceptible to infection because of decreased migratory ability of neutrophils, decreased phagocytic activity, impaired humoral immunity, increased adherence of microorganisms to diabetic cells, neuropathy and microangiopathy. Diabetic mellitus patients may be less able to defend against infection. Joshi et al, classified infection of the skin and soft tissue in diabetes mellitus patients into 2 types : mixed infection of Gram-negative bacilli and anaerob bacteria and infection of Gram-positive cocci. Furthermore, in patients with abscesses, diabetes mellitus-induced microangiopathy is believed to stimulate the growth of anaerobic bacteria because of the lack of oxygen in the peripheral tissue and decreased availability of antibacterial agent at the site of inflammation.



Diagnostic Features of Diabetic Ketoacidosis	
Serum glucose level (mg/dL)	≥300
pH	≤7.3
HCO ₃ ⁻ (mEq/L)	≤18
Serum osmolarity (mOsm/L)	<320
Serum and urine ketone levels	Moderate to high

Figure 2. Diagnostic Features of Diabetic Ketoacidosis. (references: Stoelting’s Anesthesia and Co-existing Disease. 7th Ed. Endocrine Disease)

In abscesses of the skin and soft tissue, early surgical treatment will improve prognosis in diabetes mellitus patients. In the present case, debridement were also perform early. Hyperglycaemia may be mild in the presence of a good renal function. But as the disease process evolves, glucose induced osmotic dieresis leads to volume depletion and secondary renal failure.

Treatment of diabetic ketoacidosis (DKA) consist of administration of large amounts of normal salin, effective doses of insulin, and electrolyte supplementation. The goal for decreasing blood glucose in keto-acidosis should be 75-100 mg/dl/h or 10%/h. as glucose moves intracellularly, so does potassium. Although this can quickly lead to a critical level of hypokalemia if not corrected. Potassium and blood glucose should be monitored frequently during treatment of diabetic ketoacidosis (DKA). Several liters of 0.9% saline (1-2 L the first hour, followed by 200-500 ml/h) may be required to correct dehydration. Patients may benefit from precise monitoring of urinary output during initial treatment of diabetic ketoacidosis (DKA).

Conclusions

Early diagnosis and management of infection in diabetics with diabetic ketoacidosis (DKA) are mandatory. Although the mortality rate associated with diabetic ketoacidosis (DKA) is low, treatment of the triggering factor is essential component of the management of diabetic ketoacidosis (DKA).



References

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