

INTRODUCTION

- Euglycemic diabetic ketoacidosis (euDKA) is a rare, life-threatening complication of diabetes mellitus, occurring when insulin deficiency leads to excess ketogenesis, even with normal blood glucose levels.
- Our unique case presents a diagnostic dilemma, as the refractory acidosis was initially attributed to lactic acidosis secondary to septic shock, but responded remarkably well to insulin treatment. Evaluating ketone levels proved crucial in narrowing down the diagnosis.
- Timely recognition and management are vital to prevent complications, as euDKA often presents with non-specific symptoms.

CASE HISTORY

- A 67-year-old female with a medical history of T2DM treated with empagliflozin and metformin, and chronic kidney disease stage 3B presented to the emergency department with altered mental status, nausea, and vomiting.
- Initial lab work showed a blood glucose level of 168 mg/dL, a white blood cell count of 33.93 cells/mcL, a pH of 6.53, a lactic acid level of 16 mmol/L, and an anion gap greater than 30.
- Based on imaging findings, the patient was diagnosed with septic shock secondary to cholecystitis, necessitating intensive care unit (ICU) admission. Subsequently, patient went into cardiac arrest and return of spontaneous circulation was achieved.

	0 HOURS	12-24 HOURS	24-36 HOURS
Beta hydroxybutyrate (mmol/L)	5.21	3.07	1.15
Anion Gap	>30	28	13
pH	6.53	7.02	7.31
Blood glucose level (mg/dl)	168	182	139

Table 1

Table 1: Resolution of ketonemia, closure of anion gap, normalization of pH by day 3

- Due to ongoing hemodynamic instability, patient was started on triple vasopressor support with norepinephrine, vasopressin, and epinephrine.
- Continuous renal replacement therapy was initiated due to worsening renal parameters.
- Further workup in ICU showed a beta-hydroxybutyrate level of 5.21 mmol/L; and a diagnosis of euDKA was made.
- Aggressive intravenous hydration and regular insulin drip were initiated leading to the resolution of ketonemia, improvement of anion gap, and resolution of metabolic and lactic acidosis. (Table 1)
- Interventional radiology guided percutaneous cholecystostomy drain was placed, all of which improved the patient's hemodynamic parameters. The patient was successfully extubated and transferred to the medical floor.

DISCUSSION

- The pathophysiology of euDKA involves a relative insulin deficiency leading to increased ketogenesis and decreased glucose uptake, resulting in decreased serum bicarbonate levels, causing acidosis.
- Diagnosis requires anion gap metabolic acidosis with a pH <7.3, elevated ketone levels, and normal or slightly elevated blood glucose levels [1].

- Risk factors for euDKA include a low-carbohydrate diet, fasting, pregnancy, insulin pump therapy, and SGLT2i use [2].
- In this case, patient was started on empagliflozin four weeks before presenting to the hospital.
- Treatment involves aggressive fluid resuscitation, insulin therapy, and close volume and electrolyte status monitoring to prevent complications such as cerebral edema and hyperkalemia.
- Insulin should be administered as a continuous infusion rather than bolus doses to prevent hypoglycemia [3].
- Prompt initiation of intravenous fluid resuscitation and insulin drip improved outcomes and facilitated discharge from the ICU in this case.

CONCLUSION

- This case aims to increase awareness and improve understanding of euDKA.
- Physicians should maintain a high index of suspicion for euDKA in patients with sepsis and monitor for signs such as unexplained metabolic acidosis, ketonemia, and elevated anion gap.
- Early management of euDKA is crucial to prevent severe complications and improve outcomes.

References:

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