Euglycemic diabetic ketoacidosis secondary to Sodium Glucose 2 Transport Inhibitor: a case report

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Abstract

- The purpose of this case report is to highlight the emergence of a rare adverse drug reaction (ADR), euglycemic diabetic ketoacidosis (EDKA), associated with the use of sodium glucose transport 2 (SGLT2) inhibitors.
- EDKA is a rare and often misdiagnosed condition, due to the absence of hyperglycemia, but represents a life-threatening emergency.
- We present a unique case of a 35-year-old female patient with a past medical history of diabetes and recent diagnosis of Hashimoto's thyroiditis.
- The primary objective is to provide valuable insights and education to the medical community regarding this infrequent yet significant complication.
- Ultimately, the goal is to enhance future patient care by improving awareness and promoting informed decision-making in EDKA cases involving SGLT2 inhibitors.

Introduction

- SGLT2 inhibitors provide a novel mechanism of reducing blood glucose in the treatment of diabetes by promoting renal excretion of blood glucose and current 2023 ADA guidelines place them as a potential second line option after metformin.[1]
- Recent trials have shown cardio and renal-protective effects, which has led to their increased use, but subsequently increased side effects, such as EDKA.[2-6]
- Previous case reports have shown an increase in EDKA secondary to risk factors such as caloric restriction and ketogenic diet.[7-9]
- This case report is unique because the patient was recently diagnosed with Hashimoto's disease and started on empagliflozin 2 months ago, but no other risk factors associated with EDKA are present.

Patient Information

- A 35-year-old female patient (66 kg, 170 cm) presented to a free-standing ER with intractable nausea and vomiting, which began 2 days prior to arrival.
- Past medical history: Type 2 Diabetes and Hashimoto's Thyroiditis
- Social history: drinks alcohol (2 shots of hard liquor socially twice a month), smokes marijuana, and no tobacco use
- Home medications: empagliflozin 25mg daily, glipizide 2.5mg daily, rosuvastatin 10mg daily, levothyroxine 50mcg daily, ferrous sulfate 325mg daily, and vitamin D3 1.25mg daily

Clinical Findings and Diagnostic Assessment

Vital signs: BP 132/80 mmHg, HR 81, RR 18, O_2 saturation 98% on room air

Physical exam:

- General: no acute cardiopulmonary distress and resting comfortably.
- Neuro: A&O x 4; Normal affect; Pleasant and cooperative.
- Respiratory: CTAB. No wheezing, rales or rhonchi.
- Cardiovascular: S1-S2 regular rate and rhythm. No murmurs, rubs or gallops.
- Gastrointestinal: Abdomen soft, mild generalized tenderness, nondistended. Normal active bowel sounds in all 4 quadrants. No pulsatile mass. No hepatosplenomegaly. Negative Murphy sign. McBurney's point without pain or rebound tenderness.
- Genitourinary: No CVA tenderness. No suprapubic tenderness.

Labs	Results on admission	Results on Day 2	Normal Values
Serum glucose	148	131	80-130 mg/dL
Serum sodium	139	138	136-145 mEq/L
Serum chloride	98	108	96-106 mEq/L
Serum potassium	3.2	3.6	3.5-5 mEq/L
Serum bicarbonate	22	24	22-29 mEq/L
Anion gap	18	6	4 to 12 mEq/L
Beta-hydroxybutyrate	43.1	17.2	0.4 - 0.5 mmol/L
Arterial pH	7.39	7.44	7.35-7.45
Arterial HCO3	21.3	24.9	22-26
Arterial pCO2	34.3	36	36-45
Urinary ketones	4+	Not available	Negative
Urinary glucose	2+	Not available	Negative
Ethanol level	<3		Negative

Therapeutic Intervention and Outcome

- Patient was admitted to the MICU for evaluation and treatment of EDKA.
- Empagliflozin and glipizide were held while inpatient.

Hospital course:

- Day 1: aggressive IV fluids and potassium supplementation were started prior to initiating IV insulin.
  - KCl 20 mEq/100 mL NS q2h x 3 doses
  - D5/0.45NS with 20 mEq K at 200 mL/hr
  - Insulin rate at 0.05 units/kg/hr
- Day 2: the patient's anion gap and acidosis resolved, and the insulin drip was stopped.
- Day 3: the patient was tolerating oral diet and was discharged home with the following instructions:
  - Discontinue empagliflozin.
  - Seek medical attention for any concerning symptoms of nausea, vomiting, shortness of breath, or fatigue.
  - Follow up with PCP within 1-2 weeks.

Discussion

- This report offers a comprehensive analysis of the diagnosis, management, and treatment of EDKA secondary to the use of SGLT2 inhibitors.
- This ADR has growing significance following the recent updates in the KDIGO and AHA/ACC/HFSA guidelines.
- SGLT2 inhibitors are now indicated for the management of heart failure and chronic kidney disease.

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