EUGLYCEMIC DIABETIC KETOACIDOSIS (EDKA) IN THE SETTING OF SODIUM-GLUCOSE COTRANSPORTER-2 (SGLT2) INHIBITOR USE AND VIRAL GASTROENTERITIS

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Introduction

- Euglycemic Diabetic Ketoacidosis (EDKA) is a type of diabetic ketoacidosis (DKA) that may be overlooked, as it occurs in only 10% of cases and shares features of classic DKA (metabolic acidosis and ketosis) without significant hyperglycemia (plasma glucose <200 mg/dL).[1]
- Due to its diverse etiology and deceptive glucose levels, EDKA poses a diagnostic challenge and can lead to serious complications without timely intervention.[2]
- Sodium-Glucose Cotransporter-2 (SGLT2) inhibitors, such as empagliflozin, are widely used by patients with type 2 diabetes mellitus (T2DM) for their additional benefits, however, they are also a documented risk factor for EDKA.
- This medication use, along with the presence of an acute stressor like gastroenteritis, greatly predisposes a patient to EDKA, as demonstrated below.

Clinical Presentation

- 59 year old male with history of T2DM on empagliflozin 25 mg daily, tirzepatide 15 mg weekly, metformin 1000 mg BID, and insulin glargine 50 units at bedtime presented with 3 days of sharp, constant, worsening periumbilical/epigastric pain radiating to the back with postprandial exacerbation, associated with nausea, non-bloody diarrhea, and increased urinary frequency without fever, chills, and vomiting.
- He reported recent sick contacts with non-specific gastrointestinal (GI) symptoms, decreased oral intake, and stopped insulin as a result. His diabetes had remained relatively controlled prior to hospitalization, with latest A1c 6.3%.
- On arrival to ED, he was afebrile, tachycardic, and hypotensive. Initial labs significant for leukocytosis, hyponatremia of 131 mEq/L, hyperkalemia of 5.2 mEq/L without EKG changes, hypochloremia, decreased bicarbonate, elevated glucose of 142 mg/dL, and elevated ketones. Chemistry/VBG revealed high anion gap metabolic acidosis. Urine was concentrated with glucosuria and ketonuria but no signs of infection. Lipase and lactic acid were normal.
- The patient received intravenous (IV) fluids and underwent computerized tomography scan of the abdomen and pelvis with IV contrast suggestive of acute duodenojejunal enteritis. Blood cultures were negative.

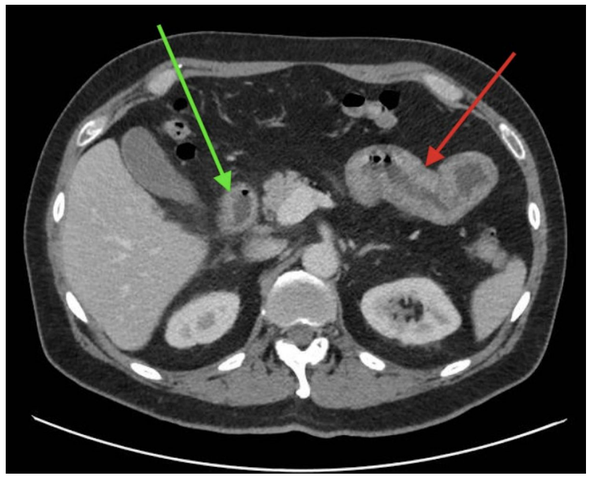

Figure 1. Acute enteritis. CT imaging showing diffuse duodenojejunal wall thickening with surrounding fat stranding, suggestive of acute enteritis, likely infective/inflammatory etiology.
Green arrow = duodenum, red arrow = jejunum

- Given plasma glucose of 142 mg/dL, high anion gap metabolic acidosis, and presence of ketones, the patient was diagnosed with EDKA secondary to acute viral gastroenteritis with related poor oral intake, discontinuation of insulin, and ongoing SGLT2 inhibitor use.
- He was started on IV insulin drip and fluids (D5NS), which was bridged with subcutaneous insulin the following day once his gap closed and acidosis resolved.
- This patient had a favorable outcome and recovered within two days after admission. Throughout his admission, he had continuous lab work evaluating both blood glucose and anion gap, among other labs, to determine the course of his EDKA.
- His blood glucose remained <200 mg/dL throughout his admission and the anion gap at time of discharge was 12 mmol/L, confirming closure of the anion gap with resolution of the acidosis.
- Prior to discharge, the patient tolerated meals well without any concerns of his GI symptoms that he initially presented. Empagliflozin was discontinued permanently.
- Safe discharge planning was coordinated, to which the patient was agreeable, and all medication changes were discussed directly with him. He was discharged home with recommended endocrinology follow-up for further diabetes management.

Discussion

- EDKA can be difficult to recognize for two key reasons: glucose levels are normal or near-normal, and it can occur in a variety of contexts, such as surgery, pregnancy, SGLT2 inhibitor use, and infection.[2]
- Given this variability, clinicians should consider DKA even when classic hyperglycemia is absent, as delayed diagnosis could lead to complications like severe dehydration.
- This case highlights the importance of checking anion gap and ketones in at-risk patients, regardless of glucose levels.

References

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