Euglycemic diabetic ketoacidosis with proximal renal tubular acidosis caused by combination of sodium-glucose cotransporter inhibitor and topiramate : Case report

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Case Study : Euglycemic diabetic ketoacidosis (EDKA) can be defined as a case in which blood sugar is not elevated and other findings are reasonable for DKA. Among the causes of EDKA, there are drug-related situations, especillay, sodium-glucose cotransporter 2(SLGT2) inhibitor. It can occur as an action of increasing ketone production and increasing the reabsorption of ketone. Recently, some patients taking SGLT2 inhibitors take topiramate together for weight control. Topiramate can cause proximal RTA, by inhibiting carbonic anhydrase enzyme. So it can occur mixed in the situation of EDKA occurrence. A 34-year-old female with type 2 diabetes visited the hospital with vomiting, diarrhea and abdominal pain that lasted for 2 days. She had started taking additional medicine, SGLT2 inhibitor (dapagliflozin) since 3 days before the visit. Laboratory tests showed anion gap 16, pH 7.1 suggestive of metabolic acidosis. Blood glucose was 156, however, ketone was observed in urine and total ketone was elevated. So treatment was started with findings in accordance with EDKA. After 2 days of treatment, without alkali supplementation, anion gap decreased but the bicarbonate was still low and metabolic acidosis had not been corrected. Hyperchloremia, hypokalemia, and urine pH 5.5 were continuously observed. In this process, we found that the patient had been taking topiramate before hospitalization, and we started supplementing sodium bicarbonate suggesting the presence of the proximal RTA. From day 3 of treatment, urine pH changed to 7.5 and metabolic acidosis had been corrected. After that, she started the diet and maintained the discontinuation of SGLT2 inhibitor and topiramate. She was discharged from the hospital while maintaining normal without acidosis under sodium bicarbonate tapering. Through these case, we should consider to the possibility of a mixture of proximal RTA in the event of EDKA in partient who take SGLT2 inhibitor and topiramate together.

table1.jpg

Table 1: Patient Initial Lab

Parameters	Patient's values	Reference range
pH	7.1	(7.35-7.45)
Na	135	(135-146 mEq/L)
K	3.5	(3.5-5.5 mEq/L)
HCO3	7	(22-26 mEq/L)
Cl	112	(96-110 mEq/L)
BUN	3.6	(5-25 mg/dl)
Cr	0.39	(0.6-1.5 mg/dl)
Urine pH	5.5	(5-9)
Urine ketone	3+	
Total ketone	6258	(≤160 umol/L)

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Table 2: After 2days Lab

Parameters	Patient's values	Reference range
pH	7.1	(7.35-7.45)
Na	135	(135-146 mEq/L)
K	3.3	(3.5-5.5 mEq/L)
HCO3	8	(22-26 mEq/L)
Cl	114	(96-110 mEq/L)
Urine pH	5.5	(5-9)

Table 3: After Sodium Bicarbonate

Parameters	Patient's values	Reference range
pH	7.35	(7.35-7.45)
Na	136	(135-146 mEq/L)
K	3.7	(3.5-5.5 mEq/L)
HCO3	16	(22-26 mEq/L)
Cl	110	(96-110 mEq/L)
Urine pH	7.5	(5-9)