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Severe hyperchloremic metabolic acidosis with SGLT2 inhibitors in patients with urinary diversion

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INTRODUCTION

URINARY DIVERSION WITH AUTOLOGOUS INTESTINAL SEGMENTS

Gold standard in urinary tract diseases.

Most frequent **metabolic abnormality** is **hyperchloremic metabolic acidosis**, due to ammonium absorption alongside chloride gain and bicarbonate excretion in the bowel conduit, as well as volume depletion due to reduced sodium absorption in the gout.

SGLT2 INHIBITORS

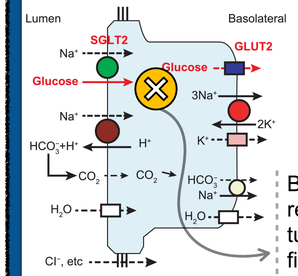

Figure adapted from (2).

- Antihyperglycemic agents;
- Recently revolutionized the paradigm of chronic kidney disease.

Block the SGLT2 proteins in the renal proximal convoluted tubules and the reabsorption of filtered glucose, promoting a greater urinary glucose excretion.

AIM

Correlation between the use of SGTL2 inhibitors and severe hyperchloremic metabolic acidosis in patients with bowel conduit.

METHOD

Consultation of medical records.

RESULTS

CASE 1

62-year-old

Medical history: orthotopic neobladder since 2005 (malignancy), type 2 diabetes, nonspecific interstitial pneumonia

10 months prior: Empagliflozin 10mg *id* (add on to metformin 1000mg *id*)

7 months prior: Cyclophosphamide (5 cycles)

Pulmonology appointment

Aggravated hyperchloremic metabolic acidosis

Emergency department

Routine arterial blood gas (ABG)	2018	February 2022
pH	7.45	**7.25**
pCO2 (mmHg)	**28**	**27.5**
pO2 (mmHg)	81	75
HCO3- (mmol/L)	**19.3**	**12**
Na+ (mmol/L)	134	143
K+ (mmol/L)	3.25	3.74
Cl- (mmol/L)	107	**122**
Lactate (mmol/L)	0.75	0.69
Anion gap (AG) (mmol/L)	7.7	9
Glucose (mg/dL)	135	**261**

OBSERVATION

Asymptomatic
Normal vital signs
No major signs

OTHER RESULTS

Blood workup: urea 81 mg/dL, creatinine 1.6 mg/dL
Ketone bodies: negative

CASE 2

63-year-old

Medical history: ileal conduit since 2018 (malignancy), type 2 diabetes, chronic kidney disease (serum creatinine 1.5-2 mg/dL)

10 months prior: Empagliflozin 10mg *id* (add on to vildagliptin/metformin 50/1000mg b*id)*

Emergency department

3-day history of lethargy and anorexia

OBSERVATION

Lethargy, glasgow coma scale 15
Normal vital signs
No other major signs

EXAMS

ABG	September 2022
pH	**6.98**
pCO2 (mmHg)	**20.5**
pO2 (mmHg)	124.4
HCO3- (mmol/L)	**4.7**
Na+ (mmol/L)	**129**
K+ (mmol/L)	3.54
Cl- (mmol/L)	**120**
Lactate (mmol/L)	0.5
AG (mmol/L)	4.3
Glucose (mg/dL)	**200**

Blood workup: urea 209 mg/dL, creatinine 2.8 mg/dL
Ketone bodies: negative
Head and abdominopelvic computed tomography without acute complications

Severe hyperchloremic metabolic acidosis

Intensive care unit

SGLT2 inhibitor withdrawn + Supportive treatment (bicarbonate, hydration, …)

Metabolic normalization and discharge

CONCLUSIONS

Chronic hyperchloremic metabolic acidosis is a **frequent** and known **complication of urinary diversion**, due to the reabsorption of urinary solutes by the intestinal mucosa.

Regarding the cases reported:

Euglycemic ketoacidosis and metformin-associated lactic acidosis were ruled out.

The acute kidney injury presented was mild compared to the grade of metabolic exacerbation.

Hypotesis:

SGLT2 inhibitors may exacerbate the chronic hyperchloremic metabolic acidosis by increasing urinary sodium and glucose excretion (volume depletion) and posterior re-uptake through the intestinal conduit, leading to hyperglycemia.

First two cases reported of severe hyperchloremic metabolic acidosis in this setting.

Further studies are needed to establish the exact underlying physiopathology.

REFERENCES

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2. **Thomson SC, Vallon V.** Renal Effects of Sodium-Glucose Co-Transporter Inhibitors. *Am J Cardiol. 2019 Dec 15;124 Suppl 1(Suppl 1):S28-S35.*

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