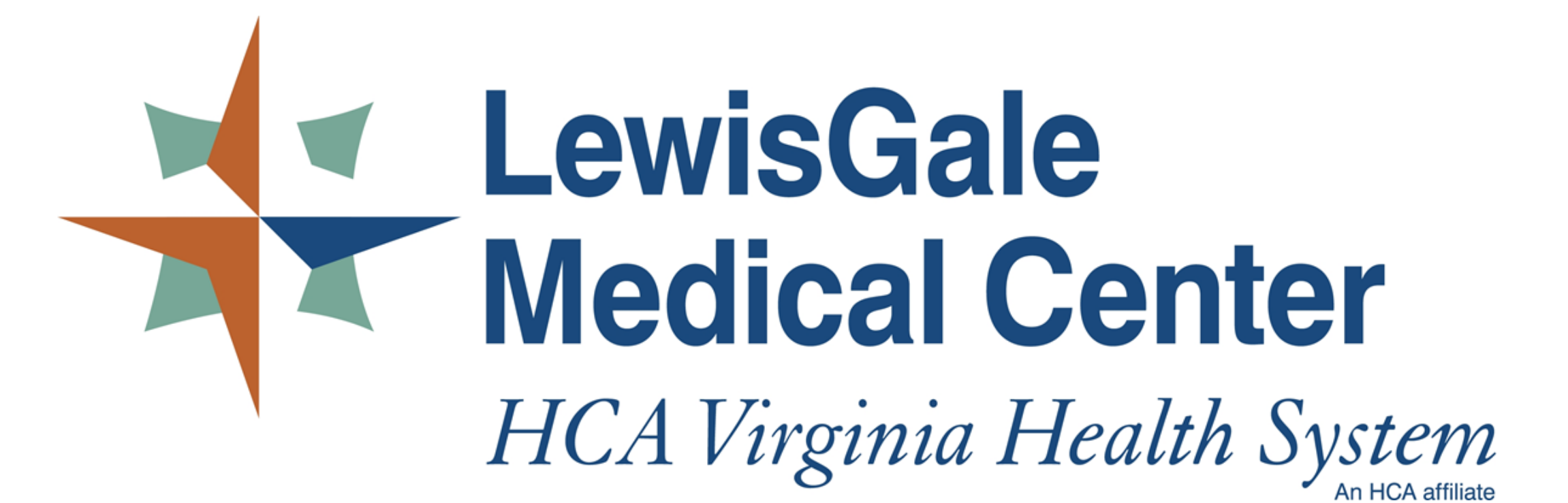


Empagliflozin Induced Fanconi Syndrome in a Patient with COVID-19

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Introduction

Fanconi syndrome is a renal tubular acidosis type 2 that also presents with phosphaturia, renal glucosuria, aminoaciduria, and tubular proteinuria. Etiologies of Fanconi syndrome include Wilson's disease, inborn errors of metabolism, type 1 glycogen storage disorders, multiple myeloma, heavy metal toxicity, and medications. While a variety of drugs can lead to Fanconi syndrome, there are only 4 published cases due to an SGLT-2 inhibitor, all of which were associated with canagliflozin. Based on our literature review, this is the first reported case of Fanconi syndrome due to empagliflozin use.

Urine Studies

Ur Na	76 mmol/L
Ur Phos	46.5 mg/dL
Ur K	31 mmol/L
Ur Protein/Cr Ratio	4.07
Ur Cystine	720 umol/g Cr
Ur Lysine	2,093.2 umol/g Cr
Ur Serine	5,432.9 umol/g Cr
Ur Glycine	11,890.3 umol/g Cr
Ur Histadine	2,973.5 umol/g Cr

(Table 1)

Case Description

61 year-old female with history of type II diabetes mellitus and rheumatoid arthritis. She had been taking empagliflozin-metformin 12.5 mg-1,000 mg, twice a day for 1.5 years and A1C was 7%. She had COVID-19, and was admitted for severe fatigue and non-anion gap metabolic acidosis. Empagliflozin-metformin was held on admission. Metabolic panel showed bicarbonate 11 mmol/L, phosphate 1.2 mg/dL, magnesium 1.5 mg/dl and potassium 2.7 mmol/L. She required a lot of replacement over the course of 9 days before returning to normal electrolyte levels (Table 2)

Electrolyte Replacement Totals in 9 days

IV Na Bicarbonate	750 mEq
PO Na Bicarbonate	13,000 mg
IV K Phosphate	150 mmol
IV Potassium Cl	250 mEq
PO Potassium Cl	3,780 mEq
IV Magnesium	2 gm

(Table 2)

Discussion

Urine studies (Table 1) including aminoaciduria also demonstrated that patient had an underlying Fanconi Syndrome. The severe fatigue was exacerbated by COVID-19 infection, but was multifactorial due to low levels of serum electrolytes as well. Fanconi syndrome is a rare form of renal tubular acidosis type II, historically associated with a variety of medications. Some notable drugs include aminoglycosides, cisplatin, valproic acid, tetracyclines, ifosfamide, and tenofovir, as well as heavy metal toxicity. Currently, Fanconi syndrome is not a known adverse effect for SGLT 2 inhibitors as there are only 4 previously reported cases. Due to recent emerging data supporting the use of this medication class in diabetes mellitus, especially complicated by congestive heart failure and chronic kidney disease, more data is needed in order to evaluate the benefits of these medications compared to the increasingly growing body of reported complications.