Real-world Evaluation of Sodium Zirconium Cyclosilicate in an Inpatient Setting

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Introduction

- Sodium zirconium cyclosilicate (Lokelma), SZC, is an inorganic cation-exchange crystal that increases fecal potassium excretion through binding of potassium in the gastrointestinal tract[1]
- Unlike other binders that bind potassium mainly in the colon, SZC may bind to potassium in the upper GI tract, leading to a faster onset of action of about one hour[2] making it an appealing option in the emergent setting
- This study evaluated the patient characteristics associated with SZC initiation and utilization for the treatment of mild and moderate hyperkalemia in the inpatient setting
- An analysis of serum potassium (K^+) and magnesium (Mg^{2+}) levels before and up to 48 hours after initiation of SZC was completed with the intent to identify a correlation between SZC usage and the incidence of hypokalemia and hypomagnesemia

Objectives

- Primary objectives: Incidence of hypokalemia (serum K^+ less than 3.5 mEq/L) and hypomagnesemia (serum Mg^{2+} less than 1.7 mg/dL) within 48 hours of SZC administration
- Secondary objectives: Percentage of patients requiring K^+ supplementation and amount of K^+ required within 48 hours of administration of SZC, and percentage who achieve normokalemia within 48 hours (3.5-5 mEq/L)

Methods

- Single center retrospective analysis between May 1, 2024 through October 30, 2024
- Inclusion criteria: Patients 18 years of age or older who received 1 dose of 10 g SZC for a K^+ level of 5.0 mEq/L or greater
- Exclusion criteria: Patients with SZC, patiromer, or sodium polystyrene sulfonate prescribed as an outpatient medication prior to admission, who received SZC for severe hyperkalemia (serum K^+ level 6.0 mEq/L or greater), or patients on outpatient hemodialysis or who received hemodialysis within 48 hours of SZC administration
- Wilcoxon signed-rank test was utilized to compare statistical differences for continuous variables, including pre/post SZC K^+ and Mg^{2+} levels and mean concentration change

Results

Table 1. Baseline Demographics

Demographic	n = 50
Age (years)[a]	76 (62-80)
Male gender[b]	24 (48)
Race	
Caucasian[b]	36 (72)
African American[b]	8 (16)
Other[b]	6 (12)
Weight (kg)[a]	84.9 (68-95.5)
Height (cm)[a]	165.1 (162.6-172.7)
BMI (kg/m^2)[a]	30.4 (23.9-35)
Agent that Increases Serum Potassium Administered within 72 hours prior to SZC	
ACE Inhibitor[b]	7 (36.8)
ARB[b]	2 (10.5)
Spironolactone[b]	10 (52.6)
Sacubitril[b]	3 (15.8)

[a] median (IQR), [b] n (%)

- SZC resulted in a statistically significant reduction in K^+ from baseline, with 94% of patients achieving normokalemia within 48 hours
- 2% of patients became hypokalemic within 48 hours of SZC administration
- 8% of patients required K^+ supplementation within 48 hours of SZC administration
- SZC did not result in a significant reduction in Mg^{2+} from baseline through 48 hours

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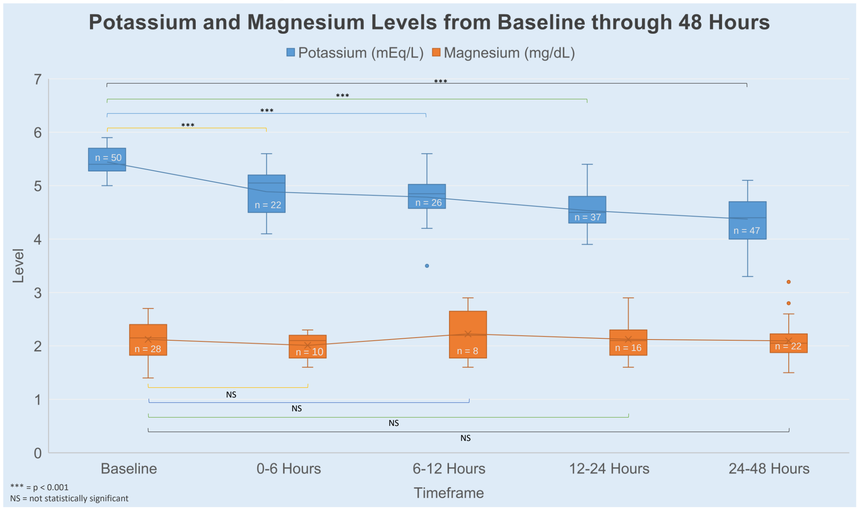
Results

Figure 1. Potassium and Magnesium Levels



Results

Figure 2. Baseline Potassium

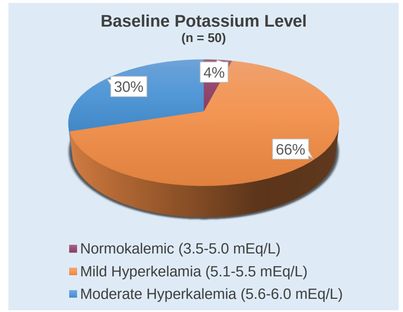


Figure 3. Hyperkalemia Treatment

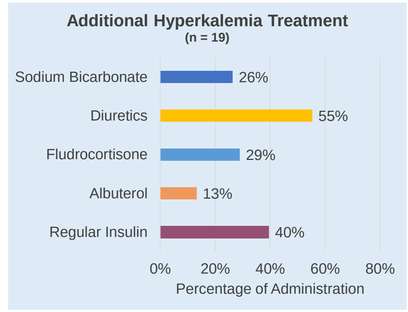


Table 2. Potassium Supplementation

Potassium Supplementation within 48 Hours	n = 50
Requirement of Potassium Supplementation[b]	4 (8)
Amount of Potassium Supplementation Required (mEq)[a]	20 (20 – 25)

Discussion

- Patients in this analysis were more likely to be Caucasian, female, and greater than 65 years old
- Patients were more likely to be classified as mild hyperkalemia prior to receiving SZC
- 44% of patients received a medication that increased K^+ within 72 hours prior to SZC administration
- Approximately 40% of patients received at least 1 additional hyperkalemia treatment, with the most commonly prescribed medications being diuretics and regular insulin
- A single dose of SZC appears adequate at reducing mild and moderate hyperkalemia even without additional hyperkalemia treatment
- 2% of patients became hypokalemic and 6% of patients remained hyperkalemic within 48 hours of SZC administration
- Only 8% of patients required K^+ supplementation within 48 hours of SZC administration, with a median administration of 20 mEq
- SZC administration did not result in a reduction in Mg^{2+} levels from baseline

Limitations

- This was a retrospective, single-center study that only analyzed the administration of a single dose of SZC
- Potassium and magnesium levels for each patient could only be reported based upon data available

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The authors have nothing to disclose.

References
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2. Packham D, Kosiborod M. Pharmacodynamics and pharmacokinetics of sodium zirconium cyclosilicate [ZS-9] in the treatment of hyperkalemia. Expert Opinion on Drug Metabolism & Toxicology. 5 Apr 2016; 12:5, 567-573.